HEXAGON TRANSPORTATION CONSULTANTS, INC.

Hale Lumber Mixed-Use Development

Traffic Impact Analysis

Prepared for:

City of Morgan Hill

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Executive Summary

This report presents the results of the traffic impact analysis conducted for the proposed Hale Lumber Mixed-Use development located in Morgan Hill, California. The project site is currently occupied by industrial uses and is bounded by Depot Street to the west, the Morgan Hill Caltrain Station to the north, the UPRR rail tracks to the east, and Dunne Avenue to the south. The proposed project consists of the replacement of the existing industrial uses on site with a mixed-use development consisting of 48 residential (40 townhome and 8 condominium) units and 3,150 square feet (s.f.) of office space.

In addition to the development of the project site with the proposed project, the realignment of Depot Street also is being proposed. Per the current City of Morgan Hill General Plan, Depot Street is planned to be realigned between Fifth Street and Dunne Avenue, shifting the south end of this roadway westward to form the north leg of the Church Street and Dunne Avenue intersection. The realigned Depot Street would continue to provide access to the Caltrain Station and all other existing land uses that it currently serves via its new full-access intersection at Dunne Avenue. The Depot Street realignment would be constructed concurrently with the proposed development, and is assumed in place for the evaluation of the project.

Scope of Study

The potential impacts related to the proposed development were evaluated following the standards and methodologies set forth by the City of Morgan Hill and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP). The study includes an analysis of AM and PM peak-hour traffic conditions for seven intersections and 16 directional freeway segments.

The proposed project is located within the Downtown Core area and it is estimated to generate less than 50 peak-hour trips. Based on two of the requirements for the preparation of a transportation impact study presented in the City of Morgan Hill Guidelines for Preparation of Transportation Impact Reports, the proposed project would be exempt from having to complete a transportation impact study. However, a third condition requiring an transportation impact study is described as a project that creates a transportation issue that City staff requests to have analyzed.

Project Trip Generation

Trip estimates for the proposed project were developed based on trip generation rates obtained from ITE's *Trip Generation*, Tenth Edition, 2017, and reductions for the proposed mixed-use land uses and close proximity to a Caltrain station.

Based on the ITE trip generation rates and applicable VTA's trip reductions, it is estimated that the proposed project would generate a net new 320 daily trips, with 25 trips (8 inbound and 17 outbound) occurring during the AM peak-hour and 32 trips (19 inbound and 13 outbound) occurring during the PM peak-hour.

Existing Plus Project Intersection Levels of Service Analysis

Intersection Level of Service Analysis

The intersection level of service is summarized in Table ES1. The results of the intersection level of service analysis under existing plus project conditions show that no study intersections would be impacted by the project according to City of Morgan Hill level of service standards.

Freeway Segment Analysis

The results of the freeway level of service analysis are summarized in Table ES 2. The freeway level of service analysis shows that the proposed project would not result in a significant impact under existing plus project conditions on any of the study freeway segments.

Year 2035 General Plan Intersection Levels of Service Analysis

The results of the intersection level of service analysis under Year 2035 General Plan plus project conditions show that no study intersections would be impacted by the project, according to City of Morgan Hill level of service standards.

Other Transportation Issues

Site Access and Circulation

Access to the project site would be provided via two driveways along Depot Street. Additionally, access to the project area would be provided by the new intersection of Depot Street with Church Street and Dunne Avenue and the existing intersection of Depot Street and Main Avenue. Both of these intersections are projected to operate acceptably with implementation of the proposed project under both existing plus project and Year 2035 General Plan plus project conditions.

A single drive aisle, located east of the proposed buildings and parallel to Depot Street, would provide access to the proposed housing units and office space via the two proposed driveways. The straight nature of the internal drive aisle, along with the two proposed access points, would facilitate vehicular circulation within the site. However, it could also result in drivers traveling at higher than the recommended speeds. For this reason, it may be desirable to implement speed-reducing measures along the internal drive aisle.

Based on the existing and proposed pedestrian facilities in the project area, pedestrian circulation would be adequate.

Recommended Site Access and On-Site Circulation Improvements

The following are recommended adjustments to improve site access and on-site circulation:

Installation of Speed-Reducing Measures. Due to the straight nature of the internal drive aisle, it may be desirable to implement speed-reducing measures to limit/prevent drivers from traveling at speeds that are unsafe. These measures could be as simple as posting speed limit signs and/or using removable on street signs, to more permanent measures such as the installation of speed bumps/humps along the internal drive aisle.

Adhere to City of Morgan Hill Design Standards and Guidelines. The design of the project site, including but not limited to driveways, sidewalks, corner radii, drive aisle width, parking dimensions, and signage, should adhere to City of Morgan Hill design standards and guidelines. This will help provide adequate on-site circulation for all vehicle types, including larger emergency vehicles.

Intersection Operations Analysis

The results of the queuing analysis at the intersection of Depot Street/Church Street and Dunne Avenue indicate that all intersection movements evaluated are projected to have adequate queue storage capacity to accommodate the estimated maximum queue lengths that would result with implementation of the project.

At the southbound approach of the intersection, however, the addition of project traffic, in addition to the Depot Street realignment, would result in the increase of the maximum queue length by 6 vehicles (from 2 to 8 vehicles, or 50 to 200 feet) during the PM peak-hour. This projected maximum queue length could be accommodated along the entire length of the street, however, the queue must not block access to any of the three Community and Cultural Center parking lot driveways proposed be located along the realigned Depot Street.

Recommended Operations Improvements

The following are recommended adjustments to improve operating conditions along Depot Street:

Installation of “Keep Clear” Signs. It is recommended that “Keep Clear” pavement markings be installed adjacent to one (the western driveway) or both of the Morgan Hill Community and Cultural Center parking lot driveways located along the realigned Depot Street. This will prevent projected maximum vehicle queue lengths at the intersection of Depot Street/Church Street and Dunne Avenue (southbound approach) from blocking access to/from the center’s parking lot.

Parking Demand

Recommended Parking Improvements

Provide Required Number of Parking Spaces. The proposed project must provide the minimum number of parking spaces required to satisfy the City’s Downtown Specific Plan parking requirements.

Transit, Pedestrian, and Bicycle Analysis

A typical mode split in Morgan Hill would be a three percent transit share. Assuming up to three percent transit mode share for the project equates to no more than 1 transit rider during each of the peak hours. The transit ridership demands of the proposed project can be accommodated by the existing transit services serving the project site.

Sidewalks are provided along both sides of the street on Dunne Avenue, Monterey Road, Fifth Street, and Depot Street, with the exception the segment on Depot Street along the project site’s frontage, south of Fifth Street. With implementation of the proposed project, sidewalks would be provided along

the entire east side of Depot Street, along the project site frontage and the realigned roadway. Additionally, the site plan shows a pedestrian pathway that would run from Depot Street to Dunne Avenue, adjacent to the project site, providing a direct pedestrian connection between the project site and Dunne Avenue. The proposed pedestrian facilities would enhance existing pedestrian facilities, providing a more complete pedestrian network. Therefore, based on the existing and proposed pedestrian facilities in the project area, continuous pedestrian connections between the project site and surrounding pedestrian destinations would be available, resulting in adequate pedestrian circulation to and from the project site.

The site plan shows on-street parking on both sides of the street along the project site frontage on Depot Street. This segment of Depot Street is shown on the site plan as having a 40-foot curb-to-curb right-of-way and would include two 12-foot travel lanes and 8 feet of parking on both sides of the street. The proposed Depot Street cross-section along the project site frontage does not include bike lanes. Additionally, an approximately 200-foot segment of the existing bike lane on the east side of Depot Street, north of Fifth Street and along the project site frontage, would be removed to accommodate the proposed on-street parking. Therefore, the existing bike lane on Depot Street would continue to be incomplete. However, the proposed pedestrian pathway that would connect Depot Street to Dunne Avenue, adjacent to the project site, also could be utilized by bicycle traffic, connecting the existing bike lanes on Dunne Avenue to Depot Street.

Conservatively assuming that bicycle trips would comprise no more than five percent of the total project-generated trips, this calculates to no more than 1-2 new bicycle trips during the peak hours. The demand generated by the proposed project could be accommodated by the existing bicycle facilities in the vicinity of the project site.

Table ES 1
Intersection Level of Service Summary

Int. #	Intersection	Intersection Control	LOS Standard	Peak Hour	Count Date	Existing		Existing Plus Project				Year 2035 General Plan		Year 2035 GP Plus Project			
						Delay[1]	LOS	Delay[1]	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C	Delay[1]	LOS	Delay[1]	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C
1	Church Street and Dunne Avenue	Signal	E	AM	06/06/18	17.8	B	17.7	B	0.1	0.060	20.0	B	18.1	B	-2.4	0.016
				PM	06/06/18	19.9	B	24.7	C	6.2	0.101	20.7	C	24.0	C	5.9	0.099
2	Monterey Road and Dunne Avenue	Signal	E	AM	06/06/18	29.6	C	29.6	C	-0.1	-0.004	30.7	C	30.4	C	-0.8	-0.039
				PM	06/06/18	30.7	C	30.6	C	-0.1	-0.002	36.2	D	36.2	D	0.0	0.000
3	Depot Street and Dunne Avenue	One-Way Stop	E	AM	06/06/18	10.4	B	*Intersection Abandoned*				12.0	B	*Intersection Abandoned*			
				PM	06/06/18	11.7	B					12.8	B				
4	Butterfield Boulevard and Dunne Avenue	Signal	D	AM	06/06/18	37.7	D	37.7	D	0.1	0.002	40.4	D	40.4	D	0.1	0.002
				PM	06/06/18	34.9	C	35.0	D	0.1	0.004	38.9	D	39.0	D	0.2	0.004
5	Depot Street and Main Avenue	Two-Way Stop	E	AM	06/06/18	20.3	C	20.4	C	N/A	N/A	38.6	E	38.6	E	N/A	N/A
				PM	06/06/18	21.0	C	21.1	C	N/A	N/A	35.5	E	35.8	E	N/A	N/A
6	Monterey Road and Fifth Avenue	Two-Way Stop	F	AM	06/06/18	18.2	C	18.1	C	N/A	N/A	96.5	F	81.0	F	N/A	N/A
				PM	06/06/18	34.1	D	34.1	D	N/A	N/A	127.0	F	122.1	F	N/A	N/A
7	Depot Street and Fifth Avenue	Two-Way Stop	F	AM	06/06/18	9.2	A	9.2	A	N/A	N/A	9.5	A	9.6	A	N/A	N/A
				PM	06/06/18	9.8	A	10.3	B	N/A	N/A	10.2	B	10.5	B	N/A	N/A

[1]The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection.
The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

Table ES 2
Freeway Segment Level of Service Summary

					Existing Plus Project												Project Trip			
					Mixed-Flow Lane						HOV Lane						Mixed-Flow Lane		HOV Lane	
#	Freeway	Segment	Direction	Peak Hour	Avg. Speed[1]	# of Lanes[1]	Capacity (vph)	Volume	Density	LOS	Avg. Speed[1]	# of Lanes[1]	Capacity (vph)	Volume	Density	LOS	Volume	% of Capacity	Volume	% of Capacity
1	US 101	from Masten Avenue to San Martin Avenue	NB	AM	66	3	6,900	4,761	24	C	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	67	3	6,900	3,202	16	B	--	--	--	--	--	--	2	0.03	--	--
2	US 101	from San Martin Avenue to Tennant Avenue	NB	AM	20	3	6,900	4,981	**83**	**F**	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	67	3	6,900	3,402	17	B	--	--	--	--	--	--	2	0.03	--	--
3	US 101	from Tennant Avenue to East Dunne Avenue	NB	AM	16	3	6,900	4,421	**92**	**F**	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	66	3	6,900	4,362	22	C	--	--	--	--	--	--	2	0.03	--	--
4	US 101	from East Dunne Avenue to Cochrane Road	NB	AM	41	3	6,900	6,290	51	E	--	--	--	--	--	--	10	0.14	--	--
			NB	PM	66	3	6,900	3,778	19	C	--	--	--	--	--	--	8	0.12	--	--
5	US 101	from Cochrane Road to Burnett Avenue (Lane Drop)	NB	AM	64	3	6,900	6,158	32	D	66	1	1,650	1,522	23	C	8	0.12	2	0.12
			NB	PM	66	3	6,900	4,567	23	C	70	1	1,650	841	12	B	7	0.10	1	0.06
6	US 101	from Burnett Avenue (Lane Drop) to Sheller Avenue	NB	AM	65	3	6,900	6,057	31	D	62	1	1,650	2,173	35	D	7	0.10	3	0.18
			NB	PM	43	3	6,900	6,337	49	E	70	1	1,650	841	12	B	7	0.10	1	0.06
7	US 101	from Sheller Avenue to Lane Drop (SB)	NB	AM	66	3	6,900	5,317	27	D	65	1	1,650	1,953	30	D	7	0.10	3	0.18
			NB	PM	66	3	6,900	3,776	19	C	70	1	1,650	1,052	15	B	6	0.09	2	0.12
8	US 101	from Lane Drop (SB) to SR 85	NB	AM	66	3	6,900	4,568	23	C	67	1	1,650	1,142	17	B	8	0.12	2	0.12
			NB	PM	67	3	6,900	3,607	18	B	70	1	1,650	491	7	A	7	0.10	1	0.06
9	US 101	from SR 85 to Lane Drop (SB)	SB	AM	67	4	9,200	3,994	15	B	67	1	1,650	541	8	A	4	0.04	1	0.06
			SB	PM	66	4	9,200	5,029	19	C	70	1	1,650	1,472	21	C	9	0.10	2	0.12
10	US 101	from Lane Drop (SB) to Sheller Avenue	SB	AM	67	3	6,900	3,404	17	B	67	1	1,650	811	12	B	4	0.06	1	0.06
			SB	PM	48	3	6,900	6,488	45	D	50	1	1,650	2,403	48	E	8	0.12	3	0.18
11	US 101	from Sheller Avenue to Burnett Avenue (Lane Drop)	SB	AM	67	3	6,900	3,204	16	B	67	1	1,650	541	8	A	4	0.06	1	0.06
			SB	PM	30	3	6,900	5,768	**64**	**F**	40	1	1,650	2,443	**61**	**F**	8	0.12	3	0.18
12	US 101	from Burnett Avenue (Lane Drop) to Cochrane Road	SB	AM	67	3	6,900	3,405	17	B	--	--	--	--	--	--	5	0.07	--	--
			SB	PM	19	3	6,900	4,801	**84**	**F**	--	--	--	--	--	--	11	0.16	--	--
13	US 101	from Cochrane Road to East Dunne Avenue	SB	AM	67	3	6,900	3,005	15	B	--	--	--	--	--	--	5	0.07	--	--
			SB	PM	42	3	6,900	6,311	50	E	--	--	--	--	--	--	11	0.16	--	--
14	US 101	from East Dunne Avenue to Tennant Avenue	SB	AM	67	3	6,900	3,602	18	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	42	3	6,900	6,301	50	E	--	--	--	--	--	--	1	0.01	--	--
15	US 101	from Tennant Avenue to San Martin Avenue	SB	AM	67	3	6,900	2,802	14	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	36	3	6,900	6,161	57	E	--	--	--	--	--	--	1	0.01	--	--
16	US 101	from San Martin Avenue to Masten Avenue	SB	AM	67	3	6,900	2,602	13	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	47	3	6,900	6,491	46	D	--	--	--	--	--	--	1	0.01	--	--

[1] Source: Santa Clara Valley Transportation Authority Congestion Management Program Monitoring Study, 2016.
Bold indicates unacceptable LOS.
Boxed indicates significant impact.

1. Introduction

This report presents the results of the traffic impact analysis conducted for the proposed Hale Lumber Mixed-Use development located in Morgan Hill, California. The project site is currently occupied by industrial uses and is bounded by Depot Street to the west, the Morgan Hill Caltrain Station to the north, the UPRR rail tracks to the east, and Dunne Avenue to the south. The proposed project consists of the replacement of the existing industrial uses on site with a mixed-use development consisting of 48 residential (40 townhome and 8 condominium) units and 3,150 square feet (s.f.) of office space.

In addition to the development of the project site with the proposed project, the realignment of Depot Street also is being proposed. Per the current City of Morgan Hill General Plan, Depot Street is planned to be realigned between Fifth Street and Dunne Avenue, shifting the south end of this roadway westward to form the north leg of the Church Street and Dunne Avenue intersection. The realigned Depot Street would continue to provide access to the Caltrain Station and all other existing land uses that it currently serves via its new full-access intersection at Dunne Avenue. The Depot Street realignment would be constructed concurrently with the proposed development, and is assumed in place for the evaluation of the project.

Access to the project sites would be provided via two driveways along Depot Street. The project site location and the surrounding study area are shown on Figure 1. The project site plan is shown on Figure 2.

Scope of Study

The potential impacts related to the proposed development were evaluated following the standards and methodologies set forth by the City of Morgan Hill and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP). The study includes an analysis of AM and PM peak-hour traffic conditions for seven intersections and 16 directional freeway segments. The study intersections and freeway segments are identified below.

According to the City of Morgan Hill Guidelines for Preparation of Transportation Impact Reports, dated February 2010, a transportation impact study is required when a proposed project generates 100 or more net peak-hour trips or adds 50 to 99 net new peak-hour trips to the roadway system where nearby intersections are currently operating at LOS D (LOS F for Downtown intersections) or worse. Projects located within the 14-block Downtown Core area are exempt from the above two requirements. A third condition requiring an transportation impact study is described as a project that creates a transportation issue that City staff requests to have analyzed.

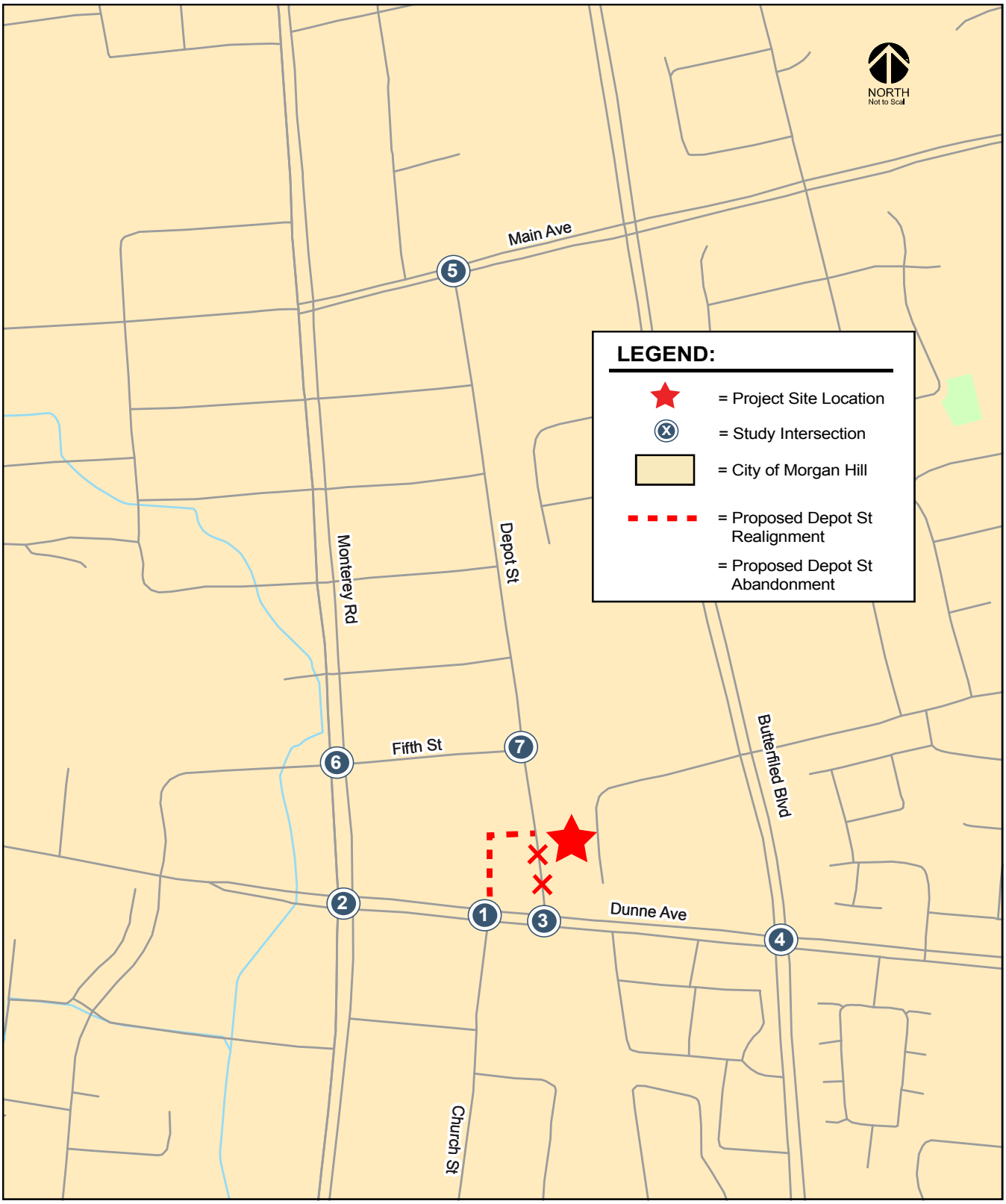
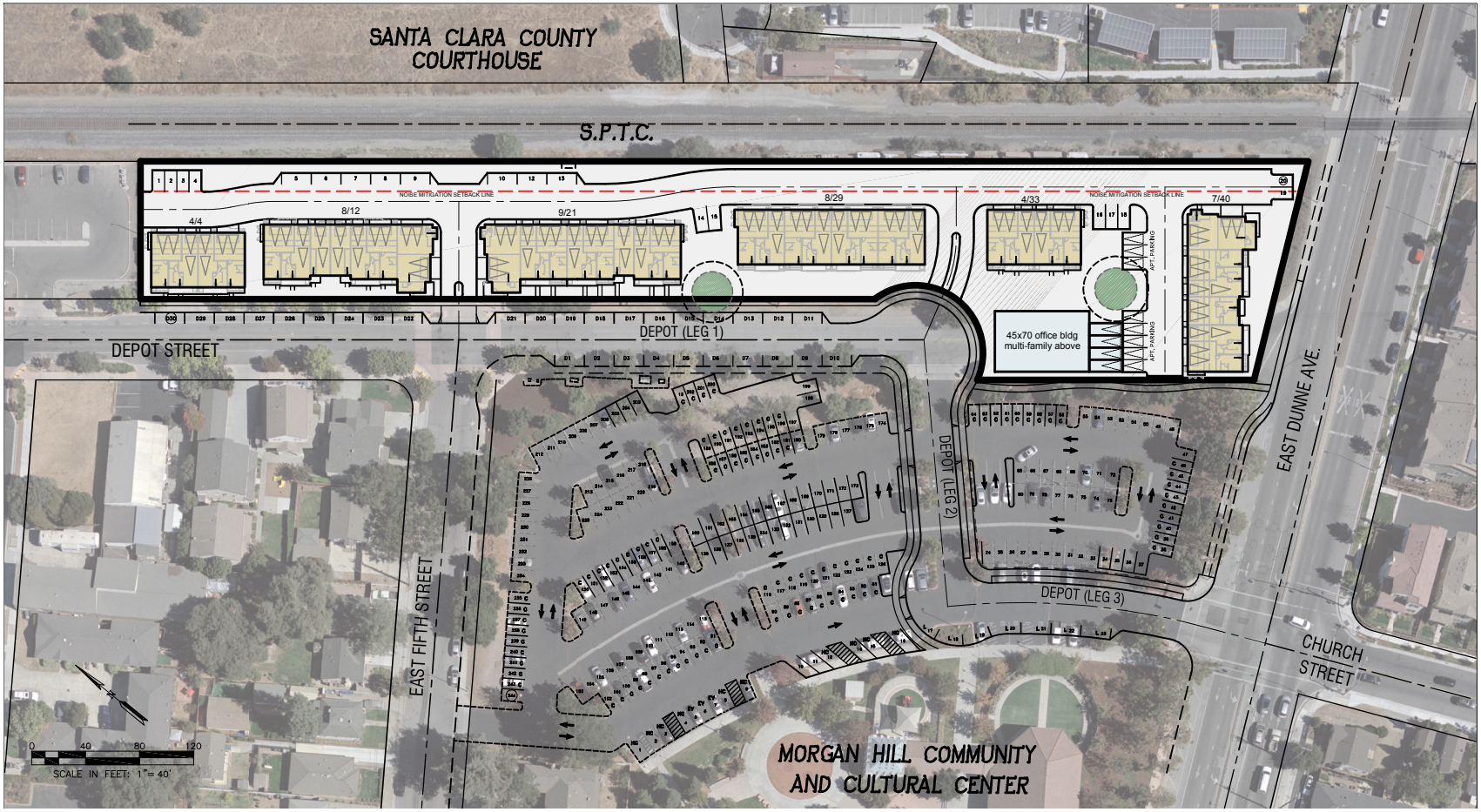


Figure 1
Site Location and Study Intersections



Source: RJA - Ruggeri-Jensen-Azar, May 21, 2018

Figure 2
Site Plan

The proposed project is located within the Downtown Core area and it is estimated to generate less than 50 peak-hour trips. Based on the above two requirements, the proposed project would be exempt from having to complete a transportation impact study.

Study Intersections

The study includes the evaluation of traffic conditions at the following three signalized intersections and four unsignalized intersection:

1. Church Street and Dunne Avenue
2. Monterey Road and Dunne Avenue
3. Depot Street and Dunne Avenue (no project conditions only, unsignalized)
4. Butterfield Boulevard and Dunne Avenue
5. Depot Street and Main Avenue (unsignalized)
6. Monterey Road and Fifth Street (unsignalized)
7. Depot Street and Fifth Street (unsignalized)

Study Freeway Segments

The study includes the evaluation of the following directional freeway segments:

1. Southbound US 101 between SR 85 and the Southbound Lane Drop
2. Southbound US 101 between Southbound Lane Drop and Sheller Avenue
3. Southbound US 101 between Sheller Avenue and Burnett Avenue
4. Southbound US 101 between Burnett Avenue and Cochrane Road
5. Southbound US 101 between Cochrane Road and Dunne Avenue
6. Southbound US 101 between Dunne Avenue and Tennant Avenue
7. Southbound US 101 between Tennant Avenue and San Martin Avenue
8. Southbound US 101 between San Martin Avenue and Masten Avenue
9. Northbound US 101 between Masten Avenue and San Martin Avenue
10. Northbound US 101 between San Martin Avenue and Tennant Avenue
11. Northbound US 101 between Tennant Avenue and Dunne Avenue
12. Northbound US 101 between Dunne Avenue and Cochrane Road
13. Northbound US 101 between Cochrane Road and Burnett Avenue
14. Northbound US 101 between Burnett Avenue and Sheller Avenue
15. Northbound US 101 between Sheller Avenue and Southbound Lane Drop
16. Northbound US 101 between the Southbound Lane Drop and SR 85

Study Time Periods

Traffic conditions at the study intersections and freeway segments were analyzed for the weekday AM and PM peak hours. The weekday AM peak hour of traffic is generally between 7:00 and 9:00 AM and the weekday PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on a typical weekday.

Study Scenarios

Traffic conditions were evaluated for the following scenarios:

Scenario 1: *Existing Conditions.* Existing conditions represent existing peak-hour traffic volumes on the existing roadway network. Existing peak-hour traffic volumes were obtained from new turn-movement traffic counts conducted at all of the study intersections.

Scenario 2: *Existing Plus Project Conditions*. Project-generated traffic volumes were added to existing traffic volumes to estimate existing plus project conditions. Adjustments to traffic volumes associated with the Depot Street realignment project also were included. Existing plus project conditions were evaluated relative to existing conditions in order to determine potential project impacts.

Scenario 3: *Year 2035 General Plan Conditions.* Year 2035 General Plan conditions represent future traffic volumes on the future transportation network. Year 2035 General Plan conditions include traffic growth projected to occur in the Year 2035 without the proposed project. This scenario includes the Year 2035 General Plan transportation network improvements without the Depot Street realignment.

Scenario 4: *Year 2035 General Plan with Project Conditions.* Year 2035 General Plan with project consists of Year 2035 General Plan traffic conditions with the addition of project traffic and the adjustments to traffic volumes associated with the Depot Street realignment project.

Methodology

This section presents the methods used to determine the traffic conditions for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards.

Data Requirements

The data required for the analysis were obtained from new peak hour intersection turn-movement counts, previous traffic studies, the City of Morgan Hill, and field observations. The following data were collected from these sources:

- existing traffic volumes
- lane configurations
- signal timing and phasing (signalized intersections)
- average speeds on freeway segments
- Year 2035 traffic forecasts

Analysis Methodologies and Level of Service Standards

Traffic conditions at the study intersections were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The analysis methods are described below.

Signalized Intersections

Signalized study intersections are subject to the City of Morgan Hill level of service standards. The City of Morgan Hill level of service methodology is TRAFFIX, which is based on the 2000 *Highway Capacity Manual* (HCM) method for signalized intersections. TRAFFIX evaluates signalized intersections operations based on average control delay time for all vehicles at the intersection. Since TRAFFIX is also the CMP-designated intersections level of service methodology, the City of Morgan Hill methodology employs the CMP defaults values for the analysis parameters, which include adjusted saturation flow rates to reflect conditions in Santa Clara County.

In accordance with the adopted threshold of significance described in the City of Morgan Hill's Guidelines for Preparation of Transportation Impact Reports, , dated February 2010, all intersections within the City of Morgan Hill are required to meet the City's LOS standard of LOS D, with the exception of the following:

- **LOS F** for Downtown intersections and segments including at Main Avenue/Monterey Road, along Monterey Road between Main Avenue and Fifth Street, and along Depot Street at First Street through Fifth Street;
- **LOS E** for the following intersections and freeway zones:
  - Main Avenue and Del Monte Avenue
  - Main Avenue and Depot Street
  - Dunne Avenue and Del Monte Avenue
  - Dunne Avenue and Monterey Avenue
  - Dunne Avenue and Church Street
  - Dunne Avenue and Depot Street
  - Cochrane Road and Monterey Road
  - Tennant Avenue and Monterey Road
  - Tennant Avenue and Butterfield Boulevard
  - Cochrane Road Freeway Zone: from Madrone Parkway/Cochrane Plaza to Cochrane Road/DePaul Drive
  - Dunne Avenue Freeway Zone: from Walnut Grove Drive/East Dunne Avenue to Condit Road/East Dunne Avenue
  - Tennant Avenue Freeway Zone: from Butterfield Boulevard/Tennant Avenue to Condit Road/Tennant Avenue

Six of the study intersections (two signalized intersections) are located within the Downtown Core area and have a LOS E or F standard. The intersection of Butterfield Boulevard and Dunne Avenue (study intersection #4) has a LOS D standard.

The correlation between average delay and level of service for signalized intersections is shown in Table 1.

Unsignalized Intersections

The methodology used to determine the level of service for unsignalized intersections is also TRAFFIX and the *2000 HCM* methodology for unsignalized intersection analysis. This method is applicable for both two-way and all-way stop-controlled intersections. For the analysis of stop-controlled intersections, the *2000 HCM* methodology evaluates intersection operations on the basis of average control delay time for all vehicles on the stop-controlled approaches. For the purpose of reporting level of service for one- and two-way stop-controlled intersections, the delay and corresponding level of service for the stop-controlled minor street approach with the highest delay is reported. For all-way stop-controlled intersections, the reported average delay and corresponding level of service is the average for all approaches at the intersection.

The City uses a minimum acceptable level of service standard of LOS D for unsignalized intersections (with the exception of unsignalized intersections located within the Downtown area and freeway zones, as described previously), in accordance with its adopted threshold of significance described in its Guidelines for Preparation of Transportation Impact Reports. All four of the unsignalized study intersections are located within the Downtown Core area and have a level of service standard of LOS E or F.

Table 1
Signalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Control Delay per Vehicle (sec.)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	up to 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Sources: Transportation Research Board, *2000 Highway Capacity Manual*. *Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority Congestion Management Program, June 2003.

The correlation between average delay and level of service for unsignalized intersections is shown in Table 2.

Signal Warrants

The level of service analysis at unsignalized intersections is supplemented with an assessment of the need for signalization of the intersection. The need for signalization of unsignalized intersections is assessed based on the Peak Hour Volume Warrant (Warrant 3) described in the *California Manual on Uniform Traffic Control Devices for Streets and Highways (CA MUTCD)*, Part 4, Highway Traffic Signals, 2014. This method makes no evaluation of intersection level of service, but simply provides an indication whether vehicular peak-hour traffic volumes are, or would be, sufficient to justify installation of a traffic signal. The decision to install a traffic signal should not be based purely on the warrants alone. Instead, the installation of a signal should be considered and further analysis performed when one or more of the warrants are met. Additionally, engineering judgment is exercised on a case-by-case basis to evaluate the effect a traffic signal will have on certain types of accidents and traffic conditions at the subject intersection as well as at adjacent intersections. Intersections that meet the peak hour warrant are subject to further analysis before determining that a traffic signal is necessary. Other

Table 2
Unsignalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Control Delay per Vehicle (sec.)
A	Operations with very low delays occurring with favorable progression.	up to 10.0
B	Operations with low delays occurring with good progression.	10.1 to 15.0
C	Operations with average delays resulting from fair progression.	15.1 to 25.0
D	Operation with longer delays due to a combination of unfavorable progression of high V/C ratios.	25.1 to 35.0
E	Operation with high delay values indicating poor progression and high V/C ratios. This is considered to be the limited of acceptable delay.	35.1 to 50.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation and poor progression.	Greater than 50.0

Source: Transportation Research Board, 2000 Highway Capacity Manual, (Washington, D.C., 2000).

options such as traffic control devices, signage, or geometric changes may be preferable based on existing field conditions.

Freeway Segments

As prescribed in the CMP technical guidelines, the level of service for freeway segments is estimated based on vehicle density. Density is calculated by the following formula:

$$D = V / (N*S)$$

Where:

D= density, in vehicles per mile per lane (vpmpl)
V= peak hour volume, in vehicles per hour (vph)
N= number of travel lanes
S= average travel speed, in miles per hour (mph)

The vehicle density on a segment is correlated to level of service as shown in Table 3. The CMP specifies that a capacity of 2,300 vehicles per hour per lane (vphpl) be used for mixed-flow lane segments that are three lanes or wider in one direction, and a capacity of 2,200 vphpl be used for mixed-flow lane segments that are two lanes wide in one direction. A capacity of 1,650 vphpl was used for high occupancy vehicle (HOV) lanes. The CMP defines an acceptable level of service for freeway segments as LOS E or better.

Table 3
Freeway Level of Service Definitions Based on Density

Level of Service	Description	Density (vehicles/mile/lane)
A	Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	0-11
B	Speeds at the free-flow speed are generally maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high.	>11-18
C	Speeds at or near the free-flow speed of the freeway prevail. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the part of the driver.	>18-26
D	Speeds begin to decline slightly with increased flows at this level. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.	>26-46
E	At this level, the freeway operates at or near capacity. Operations in this level are volatile, because there are virtually no usable gaps in the traffic stream, leaving little room to maneuver within the traffic stream.	>46-58
F	Vehicular flow breakdowns occur. Large queues form behind breakdown points.	>58

Sources: Transportation Research Board, *2000 Highway Capacity Manual. Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority Congestion Management Program, June 2003.

Report Organization

The remainder of this report is divided into five chapters. Chapter 2 describes existing conditions in terms of the existing roadway network, transit service, and existing bicycle and pedestrian facilities. Chapter 3 presents the project impact on the transportation system and describes the recommended mitigation measures under existing plus project conditions. Chapter 4 presents the analysis of other transportation related issues, including site access. Chapter 5 presents the traffic conditions in the study area under Year 2035 General Plan conditions without and with the addition of project traffic. Chapter 6 presents the conclusions of the traffic impact analysis.

2. Existing Conditions

This chapter describes the existing conditions for all of the major transportation facilities in the vicinity of the site, including the roadway network, transit service, and bicycle and pedestrian facilities.

Existing Roadway Network

Regional access to the project site is provided via US 101. Local access to the site is provided by Monterey Road, Butterfield Boulevard, Main Avenue, Fifth Street, Dunne Avenue, Church Street, and Depot Street. These facilities are described below.

US 101 is a north-south freeway extending northward to San Francisco and southward through Gilroy. US 101 is an eight-lane freeway (three mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction) north of Cochrane Road. South of Cochrane Road, it is a six-lane freeway with no HOV lanes. Access to the project site would be provided via a full interchange at Dunne Avenue.

Monterey Road is a four-lane north-south divided major arterial that runs directly through Morgan Hill. Monterey Road extends from Market Street, in downtown San Jose, to US 101 south of the City of Gilroy. Monterey Road runs west of the project site with posted speed limits ranging from 25 miles per hour (mph) to 35 mph in the project vicinity. The segment of Monterey Road between Main Avenue and Dunne Avenue is designated as a bike route (Class III facility), while the segments of Monterey Road north of Main Avenue and south of Dunne Avenue currently provide bike lanes (Class II) along both sides of the street.

Butterfield Boulevard is a north-south four-lane divided arterial roadway that runs south from Cochrane Road to its intersection with Watsonville Road/Monterey Road. Butterfield Boulevard has a posted speed limit of 45 mph. Along with Monterey Road, Butterfield Boulevard serves as a primary north-south route within the City of Morgan Hill. Butterfield Boulevard is planned to be extended north of Cochrane Road as a two-lane arterial to connect to Madrone Parkway. Bike lanes are currently provided along the entire length of Butterfield Boulevard. Butterfield Boulevard would provide access to the project site via Dunne Avenue and Main Avenue.

Main Avenue is an east-west roadway that extends from the foothills west of Dewitt Avenue over US 101 to Cochrane Road on the east part of Morgan Hill. Main Avenue is mainly a two-lane roadway, with segments that include a center two-way left-turn lane. West of Butterfield Boulevard, Main Avenue has a posted speed limit of 30 mph while east of Butterfield Boulevard, it has a posted speed limit of 40 mph. Bike lanes are found along both sides of Main Avenue. Main Avenue would provide access to the project site via Depot Street.

Fifth Street is an east-west two-lane undivided roadway that extends from Depot Street westward to west of Monterey Road, where it transitions to Del Monte Avenue. The entire length of Fifth Street is approximately one quarter of a mile long, and it provides direct access to various businesses and single family residential units that lined the street. Although no speed limit signs are posted along Fifth Street, it can be assumed that the speed limit along Fifth Street ranges between 25 and 30 mph, similar to the adjacent streets. Fifth Street would provide direct access to the project site via its intersection with Depot Street.

Dunne Avenue is an east-west four-lane major arterial, with the exception of the two-lane arterial segment between Del Monte Avenue and Peak Avenue. Dunne Avenue transverses the City extending from the east part of town to the west with a posted speed limit of 35 to 40 mph. Bike lanes are found along both side of Dunne Avenue between Peak Avenue and Gallop Drive (east of US 101). Dunne Avenue would provide access to the project site via its new proposed intersection with Depot Street.

Church Street is a north-south two-lane undivided roadway that extends between Dunne Avenue and Tennant Avenue parallel to and east of Monterey Road. In the vicinity of the project site, Church Street has a posted speed limit of 30 mph. With the proposed Depot Street realignment, Church Street would continue north of Dunne Avenue as Depot Street, providing direct access to the project site.

Depot Street is a north-south two-lane undivided roadway that extends between Main Avenue and Dunne Avenue, forming at T-intersection with both streets. Depot Street has a posted speed limit of 30 mph. With the proposed Depot Street realignment, the existing T-intersection of Depot Street with Dunne Avenue would be abandoned and Depot Street would be shifted westward approximately 200 feet to become the north leg of the existing T-intersection of Church Street and Dunne Avenue. Depot Street would provide direct access to the project site via two driveways.

Existing Bicycle and Pedestrian Facilities

As defined by the Valley Transportation Authority (VTA), bicycle facilities include Class I bikeways (defined as bike paths off street, which is shared with pedestrians and excludes general motor vehicle traffic), Class II bikeways (defined as striped bike lanes on street), and rated streets. The latter refers to streets frequently used by bicyclists, sharing the roadway with motor vehicles, and includes city designated Class III bike routes. Rated streets include extreme caution (heavy traffic volumes with high traffic speeds), alert (moderate traffic volumes and speeds), and moderate (low traffic volumes and moderate to low traffic speeds). Class III bikeways only have signs to help guide bicyclists on recommended routes to certain locations.

Bike lanes are currently provided along various roadways within the project study area, some of which serve the project site directly. Class II Bike lanes are currently provided along the following roadways:

- Depot Street, between Main Avenue and Fifth Street;
- Butterfield Boulevard, along its entire length;
- Monterey Road, nearly its entire length within City of Morgan Hill limits, with the exception of the segment that runs through downtown between Dunne Avenue and Main Avenue;
- Main Avenue, from Peak Avenue to east of US 101;
- Dunne Avenue, from Peak Avenue to east of Hill Road.

Other bicycle facilities in the project vicinity include the following:

- A bike route (Class III) on Monterey Road, between Dunne Avenue and Main Avenue;
- A paved bike path (Class I) on the east side of Butterfield Boulevard, between San Pedro Avenue and Central Avenue.

The existing bicycle facilities in the study area are presented graphically on Figure 3.

Pedestrian facilities in the study areas consist primarily of sidewalks, pedestrian push buttons and signal heads at intersections. All of the signalized intersections in the vicinity of the project site have marked crosswalks and pedestrian push buttons and signal heads.

Sidewalks are provided along at least one of the sides of the following roadways in the vicinity of the project site:

Dunne Avenue – sidewalks are provided along both sides of the street between Peak Avenue and Condit Road.

Butterfield Boulevard – sidewalks and a bicycle/pedestrian pathway are provided along both sides of the street along most of Butterfield Boulevard, with the exception of segment between Jarvis Drive (North and South) where sidewalks are provided along the east side of the street only and south of San Pedro Avenue where sidewalks are found along the west side of the street only.

Monterey Road – sidewalks are found along both sides of the street in the project vicinity.

Main Street – sidewalks are found along both sides of the street between Dewitt Avenue and just west of the US 101 overcrossing.

Fifth Street – sidewalks are found along both sides of the street between Depot Street and west of Monterey Road.

Depot Street – sidewalks are provided along both sides of the street with the exception of the project site frontage.

Existing Transit Service

Existing transit service to the study area is provided by the VTA, the Monterey-Salinas Transit (MST), and Caltrain. The Morgan Hill Caltrain Station is located on the east side of Depot Street, immediately north of the project site, and provides a connection to most transit lines serving Morgan Hill. The transit services are described below and shown on Figure 4.

Community Bus Route 16 operates on Main Avenue in the study area. It runs from Burnett Avenue to the Civic Center (Main and Dewitt) in Morgan Hill with approximately 60-minute headways in the AM and PM peak hours. Route 16 operates between 6:30 AM and 6:00 PM. The nearest Route 16 stops to the project site are located on Main Avenue between Monterey Road and Butterfield Boulevard.

Local Route 68 operates on Monterey Road and Hale Avenue on its route between the Gilroy Transit Center and the Diridon Transit Center in San Jose with 15-20 minute headways on weekdays in the AM and PM peak hours. Route 68 operates between 4:00 AM and 1:30 AM. The nearest Route 68 stops to the project site are located near the Monterey Road/Dunne Avenue intersection.

Express Route 121 operates on Butterfield Boulevard and Monterey Road on its route between the Gilroy Transit Center and the Lockheed Martin Transit Center. It operates northbound with 15 to 30-minute headways during the AM peak hour and southbound with 15 to 30-minute headways during the PM peak hour. The nearest Route 121 stop to the project site is at the Morgan Hill Caltrain Station.

Express Route 168 operates on Butterfield Boulevard and Monterey Road on its route between the Gilroy Transit Center and the San Jose Diridon Transit Center. It operates northbound with 30-minute headways during the AM peak hour and southbound with 30-minute headways during the PM peak hour. The nearest Route 168 stop to the project site is at the Morgan Hill Caltrain Station.

Figure 3
Existing Bicycle Facilities

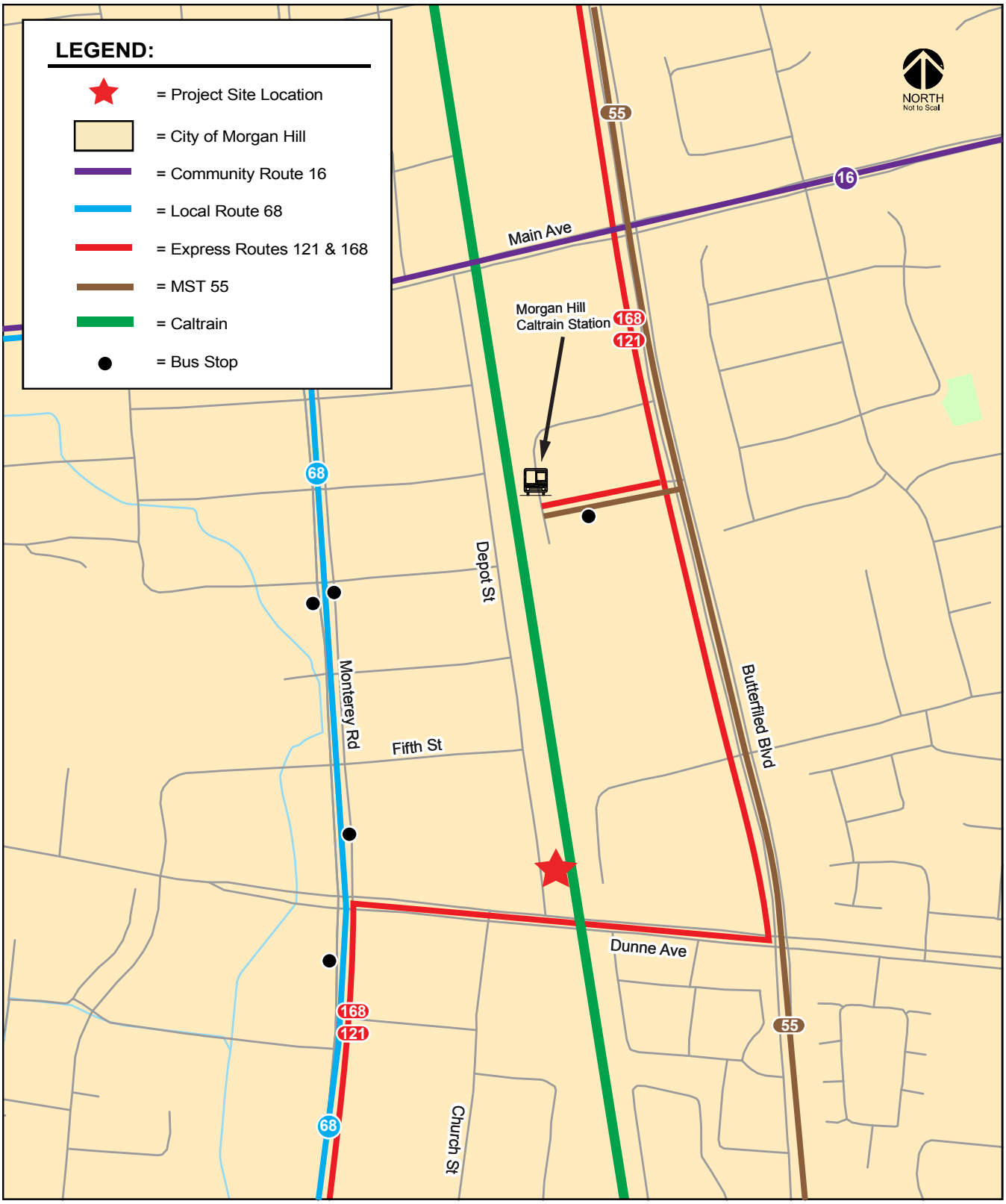


Figure 4
Existing Transit Services

The Monterey Salinas Transit (***MST 55***) provides service between Monterey and the San Jose Diridon Station with three daily trips (one during the morning, one midday, and one in the evening). The MST 55 line has scheduled stops at the Morgan Hill Caltrain Station.

Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The Morgan Hill Caltrain Station is located north of the project site, with main access and parking off of Butterfield Boulevard. At the Morgan Hill Station, Caltrain provides service with approximately 30- to 40-minute headways during commute hours.

Existing Intersection Lane Configurations

The existing lane configurations at the study intersections were determined by observations in the field and are shown on Figure 5.

Existing Traffic Volumes

Existing peak-hour traffic volumes were obtained new manual turning-movement counts conducted on June 6, 2018 at all of the study intersections. The existing peak-hour intersection volumes are shown on Figure 6. The intersection turning-movement counts are presented in Appendix A.

Existing Intersection Levels of Service

The results of the level of service analysis under existing conditions are summarized in Table 4. The results show that, measured against the City of Morgan Hill level of service standards, all the study intersections currently operate at an acceptable level of service under existing conditions during each of the peak hours analyzed.

In addition, all unsignalized study intersections currently have traffic conditions that fall below the thresholds that warrant signalization. The level of service calculation sheets are included in Appendix C. The peak-hour signal warrant sheets are contained in Appendix D.

Existing Freeway Segment Levels of Service

Traffic volumes for the subject freeway segments were obtained from the 2016 CMP Annual Monitoring Report. The results of the analysis are summarized in Table 5. The results show that the mixed-flow lanes on the following four directional study freeway segments plus one directional HOV lane segment analyzed currently operate at an unacceptable LOS F during at least one peak-hour of traffic:

Mixed-Flow Freeway Segment Unacceptable LOS F

2. US 101, Northbound from San Martin Avenue to Tennant Avenue (AM Peak Hour)
3. US 101, Northbound from Tennant Avenue to East Dunne Avenue (AM Peak Hour)
11. US 101, Southbound from Sheller Avenue to Burnett Avenue (Lane Drop) (PM Peak Hour)
12. US 101, Southbound from Burnett Avenue (Lane Drop) to Cochrane Road (PM Peak Hour)

HOV Freeway Segment Unacceptable LOS F

11. US 101, Southbound from Sheller Avenue to Burnett Avenue (Lane Drop) (PM Peak Hour)

All other freeway segments analyzed operate at LOS E or better conditions during the AM and PM peak hours.

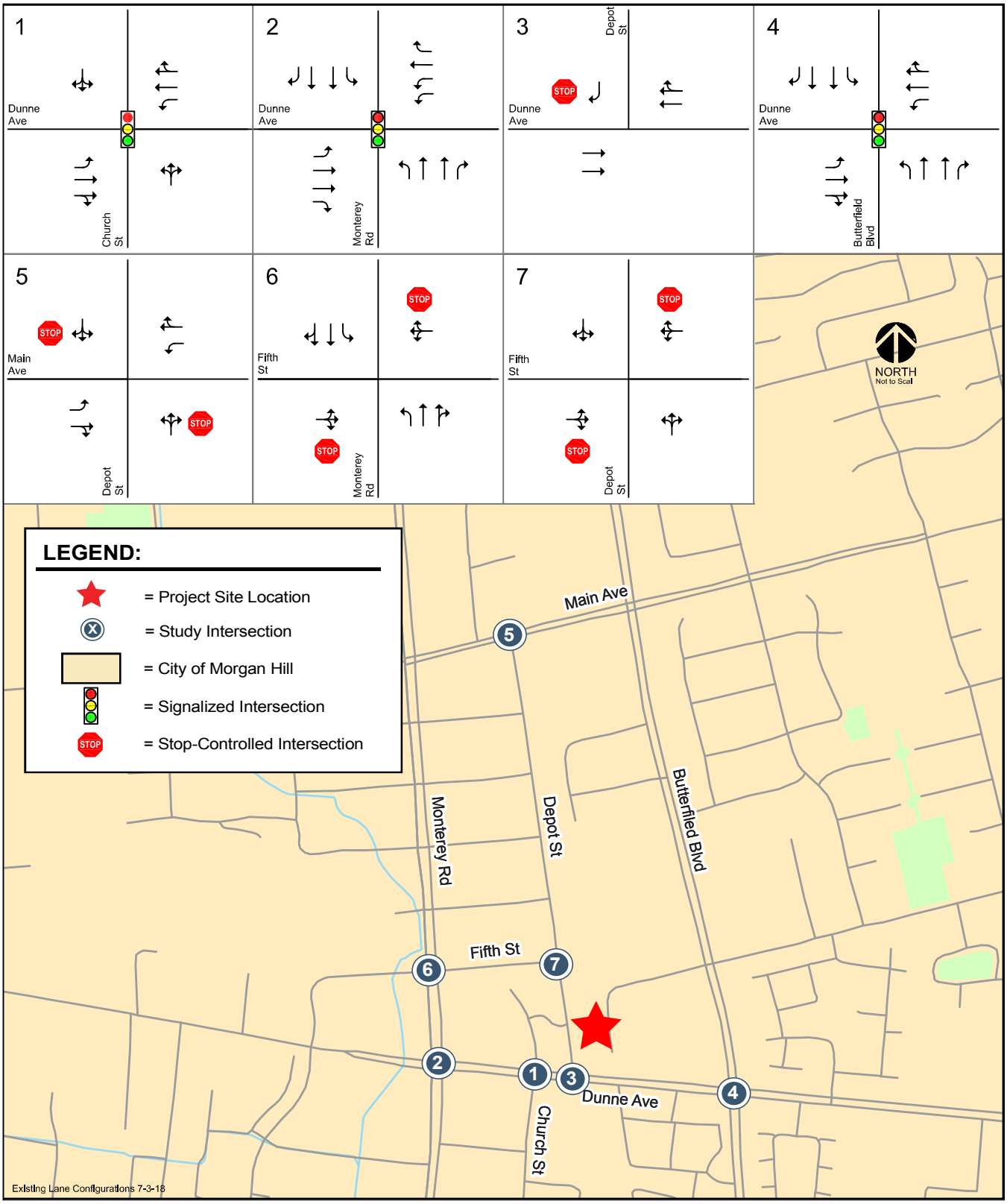


Figure 5
Existing Lane Configurations

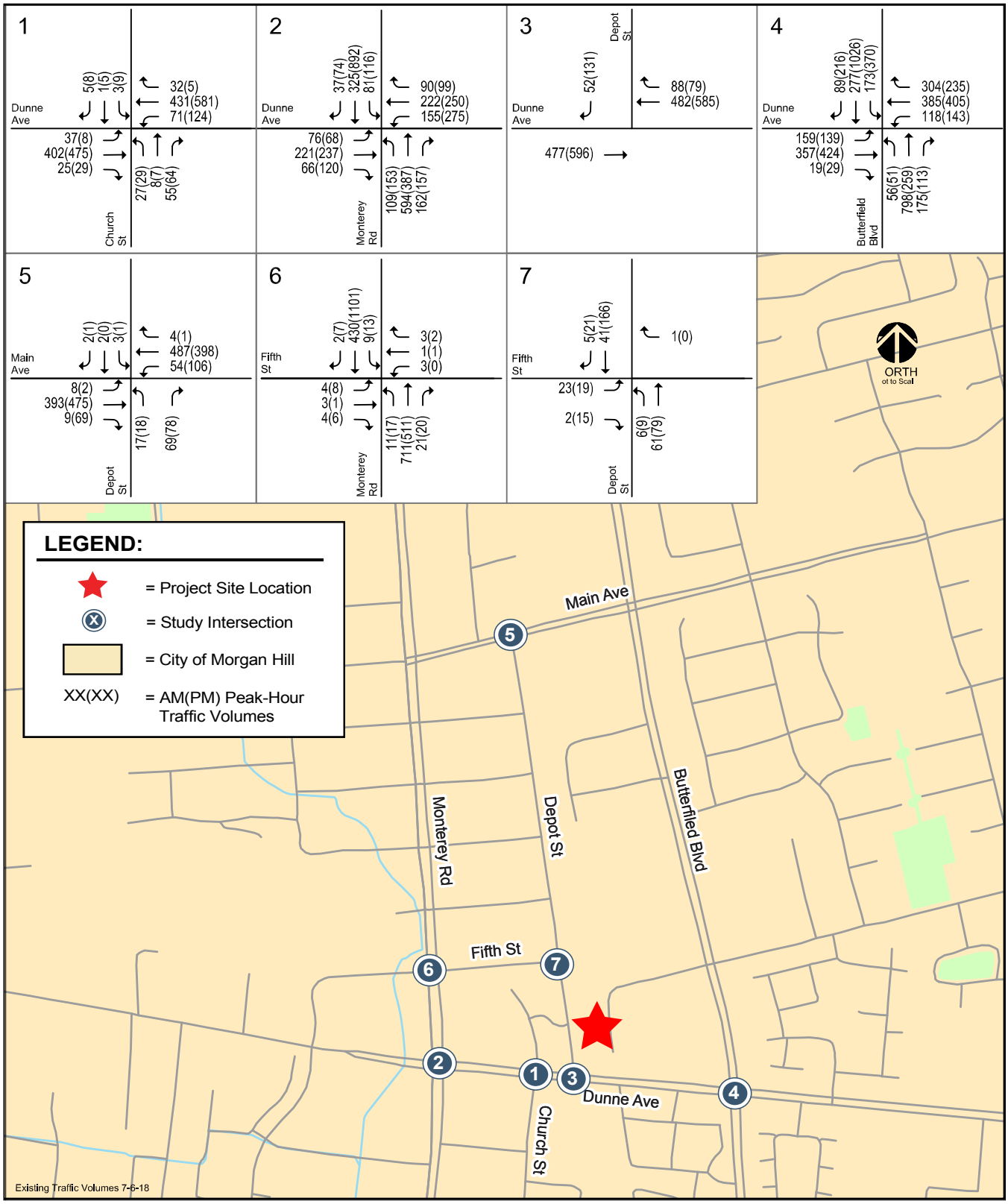


Figure 6
Existing Traffic Volumes

Table 4
Existing Intersection Levels of Service

Int. #	Intersection	Intersection Control	LOS Standard	Peak Hour	Count Date	Existing Delay[1]	Existing LOS
1	Church Street and Dunne Avenue	Signal	E	AM	06/06/18	17.8	B
				PM	06/06/18	19.9	B
2	Monterey Road and Dunne Avenue	Signal	E	AM	06/06/18	29.6	C
				PM	06/06/18	30.7	C
3	Depot Street and Dunne Avenue	One-Way Stop	E	AM	06/06/18	10.4	B
				PM	06/06/18	11.7	B
4	Butterfield Boulevard and Dunne Avenue	Signal	D	AM	06/06/18	37.7	D
				PM	06/06/18	34.9	C
5	Depot Street and Main Avenue	Two-Way Stop	E	AM	06/06/18	20.3	C
				PM	06/06/18	21.0	C
6	Monterey Road and Fifth Avenue	Two-Way Stop	F	AM	06/06/18	18.2	C
				PM	06/06/18	34.1	D
7	Depot Street and Fifth Avenue	Two-Way Stop	F	AM	06/06/18	9.2	A
				PM	06/06/18	9.8	A

[1]The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection. The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

Table 5
Existing Freeway Segment Levels of Service

#	Freeway Segment	Direction	Peak Hour	Mixed-Flow Lane Avg. Speed[1]	Mixed-Flow Lane # of Lanes[1]	Mixed-Flow Lane Volume[1]	Mixed-Flow Lane Density[1]	Mixed-Flow Lane LOS[1]	HOV Lane Avg. Speed[1]	HOV Lane # of Lanes[1]	HOV Lane Volume[1]	HOV Lane Density[1]	HOV Lane LOS[1]
1	US 101 from Masten Avenue to San Martin Avenue	NB	AM	66	3	4,760	24	C	--	--	--	--	--
		NB	PM	67	3	3,200	16	B	--	--	--	--	--
2	US 101 from San Martin Avenue to Tennant Avenue	NB	AM	20	3	4,980	**83**	**F**	--	--	--	--	--
		NB	PM	67	3	3,400	17	B	--	--	--	--	--
3	US 101 from Tennant Avenue to East Dunne Avenue	NB	AM	16	3	4,420	**92**	**F**	--	--	--	--	--
		NB	PM	66	3	4,360	22	C	--	--	--	--	--
4	US 101 from East Dunne Avenue to Cochrane Road	NB	AM	41	3	6,280	51	E	--	--	--	--	--
		NB	PM	66	3	3,770	19	C	--	--	--	--	--
5	US 101 from Cochrane Road to Burnett Avenue (Lane Drop)	NB	AM	64	3	6,150	32	D	66	1	1,520	23	C
		NB	PM	66	3	4,560	23	C	70	1	840	12	B
6	US 101 from Burnett Avenue (Lane Drop) to Sheller Avenue	NB	AM	65	3	6,050	31	D	62	1	2,170	35	D
		NB	PM	43	3	6,330	49	E	70	1	840	12	B
7	US 101 from Sheller Avenue to Lane Drop (SB)	NB	AM	66	3	5,310	27	D	65	1	1,950	30	D
		NB	PM	66	3	3,770	19	C	70	1	1,050	15	B
8	US 101 from Lane Drop (SB) to SR 85	NB	AM	66	3	4,560	23	C	67	1	1,140	17	B
		NB	PM	67	3	3,600	18	B	70	1	490	7	A
9	US 101 from SR 85 to Lane Drop (SB)	SB	AM	67	4	3,990	15	B	67	1	540	8	A
		SB	PM	66	4	5,020	19	C	70	1	1,470	21	C
10	US 101 from Lane Drop (SB) to Sheller Avenue	SB	AM	67	3	3,400	17	B	67	1	810	12	B
		SB	PM	48	3	6,480	45	D	50	1	2,400	48	E
11	US 101 from Sheller Avenue to Burnett Avenue (Lane Drop)	SB	AM	67	3	3,200	16	B	67	1	540	8	A
		SB	PM	30	3	5,760	**64**	**F**	40	1	2,440	**61**	**F**
12	US 101 from Burnett Avenue (Lane Drop) to Cochrane Road	SB	AM	67	3	3,400	17	B	--	--	--	--	--
		SB	PM	19	3	4,790	**84**	**F**	--	--	--	--	--
13	US 101 from Cochrane Road to East Dunne Avenue	SB	AM	67	3	3,000	15	B	--	--	--	--	--
		SB	PM	42	3	6,300	50	E	--	--	--	--	--
14	US 101 from East Dunne Avenue to Tennant Avenue	SB	AM	67	3	3,600	18	B	--	--	--	--	--
		SB	PM	42	3	6,300	50	E	--	--	--	--	--
15	US 101 from Tennant Avenue to San Martin Avenue	SB	AM	67	3	2,800	14	B	--	--	--	--	--
		SB	PM	36	3	6,160	57	E	--	--	--	--	--
16	US 101 from San Martin Avenue to Masten Avenue	SB	AM	67	3	2,600	13	B	--	--	--	--	--
		SB	PM	47	3	6,490	46	D	--	--	--	--	--

[1] Source: Santa Clara Valley Transportation Authority Congestion Management Program Monitoring Study, 2016.
Bold indicates unacceptable LOS.

3. Existing Plus Project Conditions

This chapter describes existing plus project traffic conditions, significant project impacts, and measures that are recommended to mitigate project impacts. Included are descriptions of the significance criteria that define an impact, estimates of project-generated traffic, identification of the impacts, and descriptions of the mitigation measures. Existing plus project conditions are represented by existing traffic conditions with the addition of traffic generated by the proposed project.

Significant Impact Criteria

Significance criteria are used to establish what constitutes an impact. Significance criteria for impacts on intersections and freeway segments for this analysis are based on the City of Morgan Hill and CMP Level of Service standards and impact criteria.

Definition of Significant Signalized Intersection Impacts

All intersections within the City of Morgan Hill are required to meet the City's LOS standard of LOS D, with the exception of the following:

- **LOS F** for Downtown intersections and segments including at Main/Monterey, along Monterey Road between Main and Fifth Street, and along Depot Street at First through Fifth Street;

- **LOS E** for the following intersections and freeway zones:

    - Main Avenue and Del Monte Avenue
    - Main Avenue and Depot Street
    - Dunne Avenue and Del Monte Avenue
    - Dunne Avenue and Monterey Avenue
    - Dunne Avenue and Church Street;
    - Dunne Avenue and Depot Street
    - Cochrane Road and Monterey Road
    - Tennant Avenue and Monterey Road
    - Tennant Avenue and Butterfield Boulevard
    - Cochrane Road Freeway Zone: from Madrone Parkway/Cochrane Plaza to Cochrane Road/DePaul Drive
    - Dunne Avenue Freeway Zone: from Walnut Grove Drive/East Dunne Avenue to Condit Road/East Dunne Avenue
    - Tennant Avenue Freeway Zone: from Butterfield Boulevard/Tennant Avenue to Condit Road/Tennant Avenue

Two of the three signalized study intersections are located within the Downtown Core area and have a LOS E standard. The intersection of Butterfield Boulevard and Dunne Avenue (study intersection #4) has a LOS D standard.

According to the City of Morgan Hill level of service significant impact thresholds, a development is said to create a significant adverse impact on traffic conditions at a signalized intersection if for either peak hour:

1. The level of service at the intersection degrades from an acceptable level (LOS D or LOS E as identified above) under existing conditions to an unacceptable level (LOS E or F) under project conditions, or
2. The level of service at the intersection is an unacceptable level (LOS E or F as identified above) under existing conditions and the addition of project trips causes the average critical delay to increase by four (4) or more seconds *and* the volume-to-capacity ratio (V/C) to increase by 0.01.

An exception to this rule applies when the addition of project traffic reduces the amount of average delay for critical movements (i.e., the change in average delay for critical movements is negative). In this case, the threshold of significance is an increase in the critical V/C value by 0.01 or more.

Definition of Significant Unsignalized Intersection Impacts

Unsignalized intersections within the City of Morgan Hill have a minimum operating level of LOS D, with the exception of unsignalized intersections located within the Downtown area and freeway zones, as identified above, which have a LOS E or F standard. All four of the unsignalized study intersections are located within the Downtown Core area and have a level of service standard of LOS E or F.

According to the City of Morgan Hill level of service significant impact thresholds, a development is said to have a significant adverse impact on traffic conditions at an unsignalized intersection if for either peak hour the intersection (for all-way stop control) or the worst approach (for one- and two-way stop control) delay corresponds to an unacceptable LOS E or F ***and*** the traffic volumes at the intersection are sufficiently high to satisfy the peak hour volume warrant. For unsignalized intersections with a LOS F standard, a significant impact would occur when the traffic volumes at the intersection are sufficiently high to satisfy the peak hour volume warrant.

CMP Definition of Significant Freeway Segment Impacts

A project is said to create a significant adverse impact on traffic conditions on a CMP freeway segment if for either peak hour:

1. The level of service on the freeway segment is an unacceptable LOS F under no project conditions, and the number of project trips on that segment constitutes at least one percent of capacity on that segment.
2. The level of service on the freeway segment degrades from an acceptable LOS E or better under existing conditions to an unacceptable LOS F under project conditions.

A significant impact by CMP standards is said to be satisfactorily mitigated when measures are implemented that would restore freeway conditions to LOS E or better.

Project Description

The proposed project consists of the replacement of the existing industrial uses on site with a mixed-use development consisting of 48 housing units (40 townhome units and 8 condominium units) and 3,150 square feet (s.f.) of office space. The town home units would be three stories high, each with a two-car garage. The condominium units will be located on the second and third floor of the mixed-use building, with the proposed office space located on the first floor. Parking for the condominium units would be located adjacent to the mixed-use building.

In addition to the development of the project site, the realignment of Depot Street, between Fifth Street and Dunne Avenue, also is being proposed. The proposed realignment would shift the south end of Depot Street westward to form the north leg of the Church Street and Dunne Avenue intersection. The Depot Street realignment would be constructed concurrently with the proposed development, and is assumed in place for the evaluation of the project.

Transportation Network under Existing Plus Project Conditions

It is assumed in this analysis that the roadway network and intersection configurations under existing plus project conditions would be the same as described under existing conditions with the exception of the following improvements that would be constructed as part of the project:

Depot Street Realignment. The realignment of Depot Street is being proposed as part of the project. Per the current City of Morgan Hill General Plan, Depot Street is planned to be realigned between Fifth Street and Dunne Avenue, shifting the south end of this roadway westward to form the north leg of the Church Street and Dunne Avenue intersection (currently the north leg of this intersection is the driveway providing access to the Morgan Hill Community and Cultural Center). The realignment would begin approximately 250 feet north of Dunne Avenue (at the existing Community and Cultural Center driveway on Depot Street), with a 90-degree bend on the roadway westward into the Center's parking lot and a second almost immediate 90-degree bend southward to connect to the Church Street/Dunne Avenue intersection (see Figure 2). The realigned Depot Street would continue to provide access to the Caltrain Station and all other existing land uses that it currently serves, in addition to the proposed project, via its new full-access intersection at Church Street/Dunne Avenue.

With the realignment and in conjunction with the proposed project, parallel on-street parking would be provided along the project site frontage and along most of the Community and Cultural Center's frontage on Depot Street. The site plan identifies an increase of 11 curb side parking spaces (from 19 to 30) along Depot Street with the proposed Depot Street realignment. The realignment would not affect the existing number of on-site parking spaces at the Community and Cultural Center since it would transverse its parking lot along existing drive aisles. With the realignment, however, the center's parking lot would be divided into two separate lots with two driveways along the realigned Depot Street providing access to the north parking lot and one driveway providing access to the south parking lot.

The Depot Street realignment would be constructed concurrently with the proposed development.

Depot Street/Dunne Avenue Intersection Abandonment. With the proposed Depot Street realignment, the southern end of Depot Street, approximately 250-foot long segment north of Dunne Avenue, and the intersection of Depot Street and Dunne Avenue, would be abandoned. The abandoned roadway segment would become part of the project site.

Project Trip Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear are estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the AM and PM peak hours. As part of the project trip distribution step, an estimate is made of the directions to and from which the project trips would travel. In the project trip assignment step, the project trips are assigned to specific streets and intersections in the study area. These procedures are described further in the following sections.

Trip Generation

Through empirical research, data have been collected that correlate to common land uses their propensity for producing traffic. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. Hexagon has prepared project trip estimates for the proposed project based on trip generation rates obtained from the Institute of Transportation Engineers' (ITE's) *Trip Generation Manual*, Tenth Edition, 2017. The proposed project consists of the development of 48 residential (40 townhome and 8 condominium) units and 3,150 s.f. of office space. As a conservative approach, trig generation rates for townhouse units were applied to all proposed 48 residential units.

Trip reductions were applied for the mixed-use components of the project and for its proximity to a major bus stop, as prescribed by the VTA Transportation Impact Analysis Guidelines (October 2014). The trip estimates for each of the proposed land use components of the project were reduced to account for internalization, or trips made between each of the proposed land uses. The reductions are based on the assumption that vehicle trips to each of the proposed land uses of the site would be reduced due to internalization of trips. The VTA recommends trip reductions of 3 percent (%) to account for the internalization between residential and employment land uses. The 3% reduction is based on the smaller trip generator and is applied to both land uses. Furthermore, the VTA recommends transit reductions of 9% and 6% to be applied to the trips estimated to be generated by residential and employment projects, respectively, that are located within a 2,000-foot walking distance of a transit facility. The proposed project site is located less than 2,000 feet from the Morgan Hill Caltrain Station.

Typically, trip credit for the existing uses on site is applied to the estimated trips for the proposed project since traffic generated by the existing uses would no longer access the project site once the proposed project is built. However, the project site is currently occupied by industrial uses, which generate minimal traffic during the peak hours. Therefore, as a conservative approach, trip credit for the existing uses on-site was not taken.

Based on the ITE trip generation rates and applicable VTA's trip reductions, it is estimated that the proposed project would generate a net new 320 daily trips, with 25 trips (8 inbound and 17 outbound) occurring during the AM peak-hour and 32 trips (19 inbound and 13 outbound) occurring during the PM peak-hour. The project trip generation estimates for the proposed project are presented in Table 6.

Trip Distribution

The trip distribution pattern for project-generated traffic was estimated based on existing travel patterns on the surrounding roadway system and on the locations of complementary land uses. The project trip distribution pattern is shown graphically on Figure 7.

Table 6
Project Trip Generation Estimates

Land Use	ITE Land Use Code	Reduction %	Size	Daily		AM Peak Hour						PM Peak Hour					
							Split		Trip				Split		Trip		
				Rate	Trip	Rate	In	Out	In	Out	Total	Rate	In	Out	In	Out	Total
Multi-family Housing (Low-Rise)	220		48 Dwelling Units	6.709	322	0.495	23%	77%	6	18	24	0.640	63%	37%	20	11	31
Housing & Employment [1]		*3%*			*-1*				*0*	*0*	*0*				*0*	*0*	*0*
Housing near a Caltrain station [2]		*9%*			*-29*				*-1*	*-2*	*-3*				*-2*	*-1*	*-3*
General Office Building	710		3,150 Square Feet	9.740	31	1.160	86%	14%	3	1	4	1.150	16%	84%	1	3	4
Housing & Employment [1]		*3%*			*-1*				*0*	*0*	*0*				*0*	*0*	*0*
Employment near a Caltrain station [2]		*6%*			*-2*				*0*	*0*	*0*				*0*	*0*	*0*
Net Project Trips					**320**				**8**	**17**	**25**				**19**	**13**	**32**

Source: ITE Trip Generation Manual, 10th Edition 2017

[1] As prescribed by the VTA Transportation Impact Analysis Guidelines (October 2014), the maximum trip reduction for a mixed-use development project with housing and employment components is equal to 3% off the smaller trip generator.

[2] As prescribed by the VTA Transportation Impact Analysis Guidelines (October 2014), the maximum trip reduction for housing and employment located within a 2,000-foot walking distance of a Caltrain station (Morgan Hill Caltrain Station) is equal to 9% for the housing and 6% for the employment components.

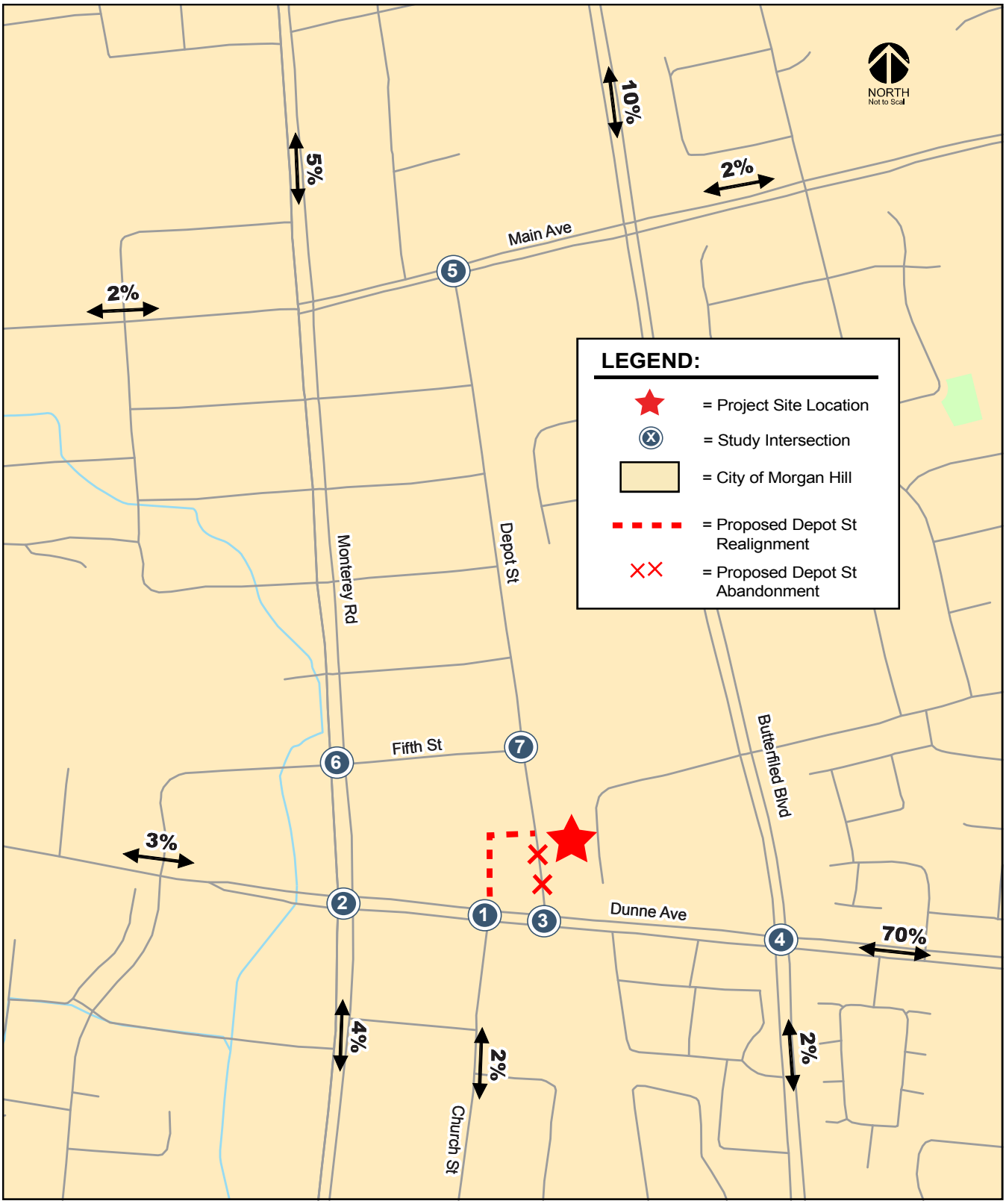


Figure 7
Project Trip Distribution

Trip Assignment

The peak-hour trips associated with the proposed project were added to the transportation network in accordance with the distribution pattern discussed above. Figure 8 shows the assignment of project traffic on the local transportation network. A tabular summary of project traffic at each study intersection is contained in Appendix B.

Existing Plus Project Traffic Volumes

Project trips, as presented in the above project trip assignment, were added to existing traffic volumes to obtain existing plus project traffic volumes. In addition, a reassignment of existing traffic was conducted to account for the anticipated change in travel patterns in the immediate project area associated with the proposed Depot Street realignment.

Currently, access between Depot Street and Dunne Avenue is limited to right-turn access only. The Depot Street realignment would provide full-access to and from the Depot Street area via Dunne Avenue, resulting in the displacement of traffic between some of the surrounding intersections, in particular the intersections of Church Street/Dunne Avenue, Monterey Road/Dunne Avenue, Monterey Road/Fifth Street, and Deport Street/Fifth Street. Therefore, the reassignment of existing traffic due to the proposed Depot Street realignment and the proposed project trips were added to existing traffic volumes to obtain existing plus project traffic volumes.

The existing plus project traffic volumes are shown on Figure 9.

Existing Plus Project Intersection Analysis

The results of the level of service analysis under existing plus project conditions are summarized in Table 7. The results show that, measured against the City of Morgan Hill level of service standards, all the study intersections are projected to operate at acceptable levels of service under existing plus project conditions during each of the peak hours analyzed. Therefore, no study intersections would be significantly impacted by the project, according to City's level of service impact criteria.

In addition, all unsignalized study intersections are projected to have traffic conditions that fall below the thresholds that warrant signalization under existing plus project conditions. The level of service calculation sheets are included in Appendix C. The peak-hour signal warrant sheets are contained in Appendix D.

Freeway Segment Analysis

The results of the CMP freeway level of service analysis under existing plus project conditions are summarized in Table 8. Traffic volumes on the study freeway segments under existing plus project conditions were estimated by adding to the existing traffic volumes obtained from the 2016 CMP Annual Monitoring Report the estimated project trips on the freeway. The results show that the project would not cause an increase in traffic volumes of one percent or more of freeway capacity on any freeway segments currently operating at an unacceptable LOS F, nor would the addition of project traffic result in the degradation of LOS on any freeway segment currently operating at an acceptable LOS E to an unacceptable LOS F. Therefore, based on CMP impact criteria, the proposed project would not have a significant impact on freeways.

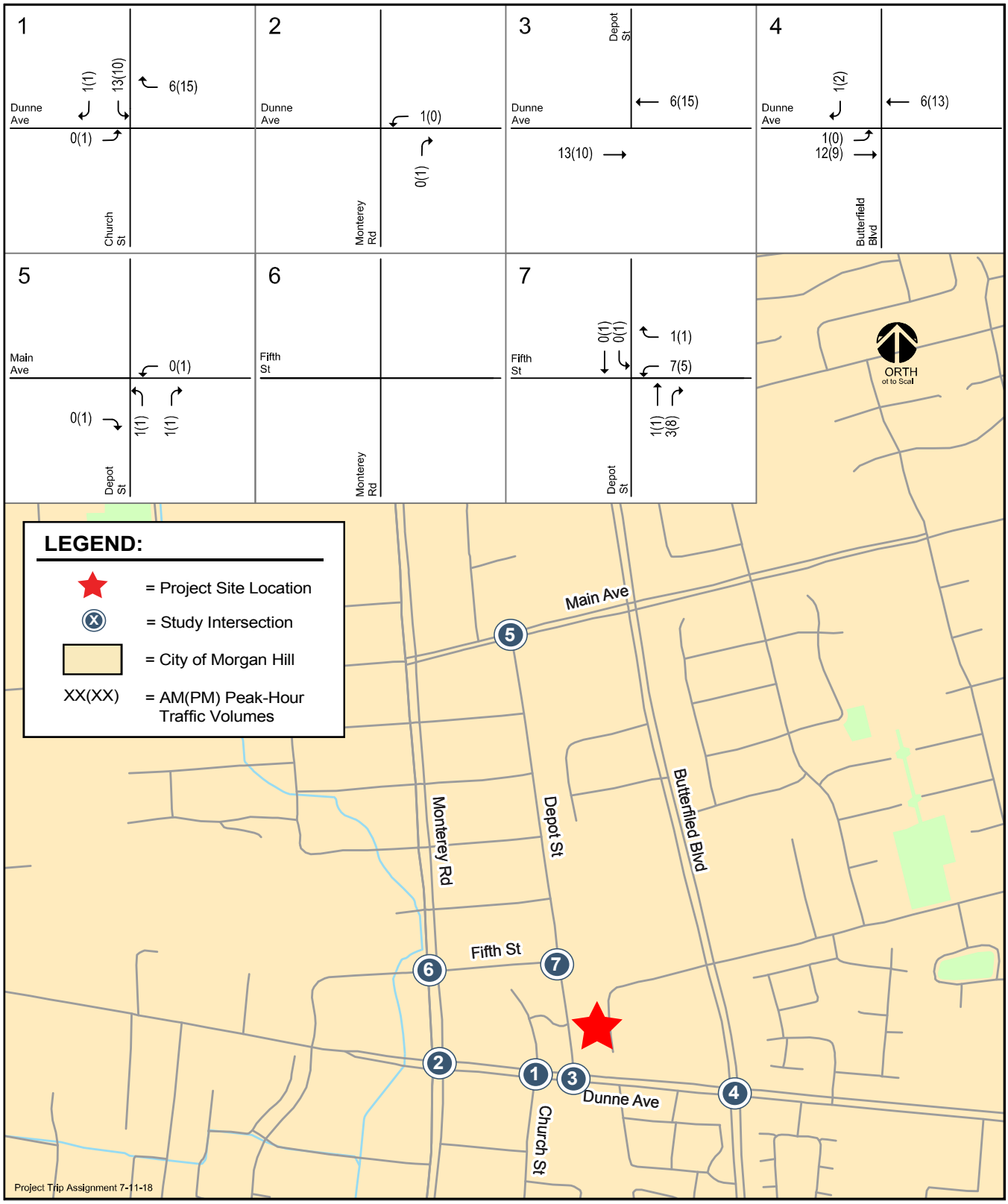


Figure 8
Project Trip Assignment

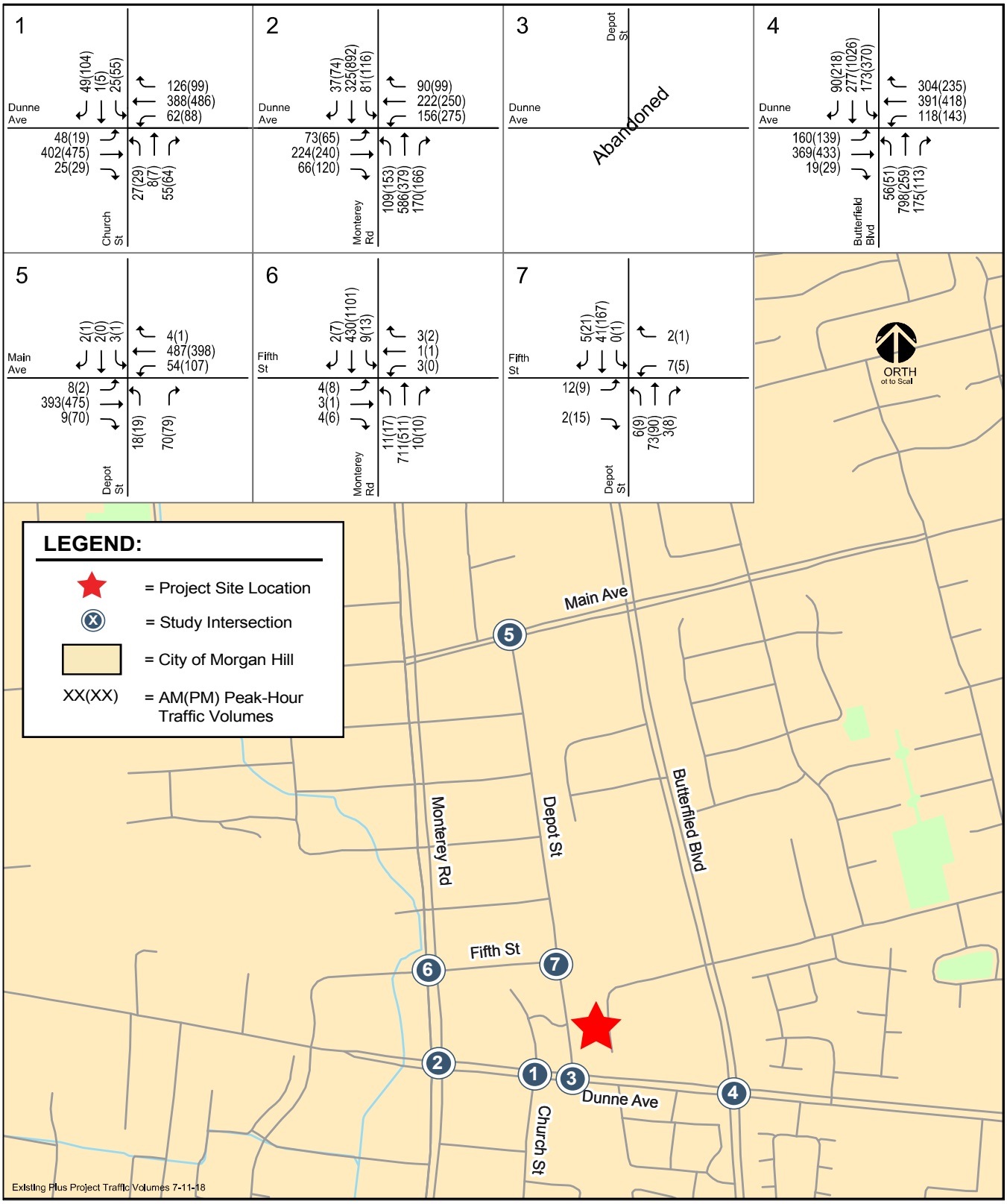


Figure 9
Existing Plus Project Traffic Volumes

Table 7
Existing Plus Project Intersection Levels of Service

Int. #	Intersection	Existing Intersection Control	LOS Standard	Peak Hour	Existing		Existing Plus Project			
					Delay[1]	LOS	Delay[1]	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C
1	Church Street and Dunne Avenue	Signal	E	AM	17.8	B	17.7	B	0.1	0.060
				PM	19.9	B	24.7	C	6.2	0.101
2	Monterey Road and Dunne Avenue	Signal	E	AM	29.6	C	29.6	C	-0.1	-0.004
				PM	30.7	C	30.6	C	-0.1	
3	Depot Street and Dunne Avenue	One-Way Stop	E	AM	10.4	B	*Intersection Abandoned*			
				PM	11.7	B				
4	Butterfield Boulevard and Dunne Avenue	Signal	D	AM	37.7	D	37.7	D	0.1	0.002
				PM	34.9	C	35.0	D	0.1	0.004
5	Depot Street and Main Avenue	Two-Way Stop	E	AM	20.3	C	20.4	C	N/A	N/A
				PM	21.0	C	21.1	C	N/A	N/A
6	Monterey Road and Fifth Avenue	Two-Way Stop	F	AM	18.2	C	18.1	C	N/A	N/A
				PM	34.1	D	34.1	D	N/A	N/A
7	Depot Street and Fifth Avenue	Two-Way Stop	F	AM	9.2	A	9.2	A	N/A	N/A
				PM	9.8	A	10.3	B	N/A	N/A

[1]The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection. The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

Table 8
Freeway Segment Levels of Service Summary

					Existing Plus Project												Project Trip			
					Mixed-Flow Lane						HOV Lane						Mixed-Flow Lane		HOV Lane	
#	Freeway	Segment	Direction	Peak Hour	Avg. Speed[1]	# of Lanes[1]	Capacity (vph)	Volume	Density	LOS	Avg. Speed[1]	# of Lanes[1]	Capacity (vph)	Volume	Density	LOS	Volume	% of Capacity	Volume	% of Capacity
1	US 101	from Masten Avenue to San Martin Avenue	NB	AM	66	3	6,900	4,761	24	C	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	67	3	6,900	3,202	16	B	--	--	--	--	--	--	2	0.03	--	--
2	US 101	from San Martin Avenue to Tennant Avenue	NB	AM	20	3	6,900	4,981	**83**	**F**	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	67	3	6,900	3,402	17	B	--	--	--	--	--	--	2	0.03	--	--
3	US 101	from Tennant Avenue to East Dunne Avenue	NB	AM	16	3	6,900	4,421	**92**	**F**	--	--	--	--	--	--	1	0.01	--	--
			NB	PM	66	3	6,900	4,362	22	C	--	--	--	--	--	--	2	0.03	--	--
4	US 101	from East Dunne Avenue to Cochrane Road	NB	AM	41	3	6,900	6,290	51	E	--	--	--	--	--	--	10	0.14	--	--
			NB	PM	66	3	6,900	3,778	19	C	--	--	--	--	--	--	8	0.12	--	--
5	US 101	from Cochrane Road to Burnett Avenue (Lane Drop)	NB	AM	64	3	6,900	6,158	32	D	66	1	1,650	1,522	23	C	8	0.12	2	0.12
			NB	PM	66	3	6,900	4,567	23	C	70	1	1,650	841	12	B	7	0.10	1	0.06
6	US 101	from Burnett Avenue (Lane Drop) to Sheller Avenue	NB	AM	65	3	6,900	6,057	31	D	62	1	1,650	2,173	35	D	7	0.10	3	0.18
			NB	PM	43	3	6,900	6,337	49	E	70	1	1,650	841	12	B	7	0.10	1	0.06
7	US 101	from Sheller Avenue to Lane Drop (SB)	NB	AM	66	3	6,900	5,317	27	D	65	1	1,650	1,953	30	D	7	0.10	3	0.18
			NB	PM	66	3	6,900	3,776	19	C	70	1	1,650	1,052	15	B	6	0.09	2	0.12
8	US 101	from Lane Drop (SB) to SR 85	NB	AM	66	3	6,900	4,568	23	C	67	1	1,650	1,142	17	B	8	0.12	2	0.12
			NB	PM	67	3	6,900	3,607	18	B	70	1	1,650	491	7	A	7	0.10	1	0.06
9	US 101	from SR 85 to Lane Drop (SB)	SB	AM	67	4	9,200	3,994	15	B	67	1	1,650	541	8	A	4	0.04	1	0.06
			SB	PM	66	4	9,200	5,029	19	C	70	1	1,650	1,472	21	C	9	0.10	2	0.12
10	US 101	from Lane Drop (SB) to Sheller Avenue	SB	AM	67	3	6,900	3,404	17	B	67	1	1,650	811	12	B	4	0.06	1	0.06
			SB	PM	48	3	6,900	6,488	45	D	50	1	1,650	2,403	48	E	8	0.12	3	0.18
11	US 101	from Sheller Avenue to Burnett Avenue (Lane Drop)	SB	AM	67	3	6,900	3,204	16	B	67	1	1,650	541	8	A	4	0.06	1	0.06
			SB	PM	30	3	6,900	5,768	**64**	**F**	40	1	1,650	2,443	**61**	**F**	8	0.12	3	0.18
12	US 101	from Burnett Avenue (Lane Drop) to Cochrane Road	SB	AM	67	3	6,900	3,405	17	B	--	--	--	--	--	--	5	0.07	--	--
			SB	PM	19	3	6,900	4,801	**84**	**F**	--	--	--	--	--	--	11	0.16	--	--
13	US 101	from Cochrane Road to East Dunne Avenue	SB	AM	67	3	6,900	3,005	15	B	--	--	--	--	--	--	5	0.07	--	--
			SB	PM	42	3	6,900	6,311	50	E	--	--	--	--	--	--	11	0.16	--	--
14	US 101	from East Dunne Avenue to Tennant Avenue	SB	AM	67	3	6,900	3,602	18	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	42	3	6,900	6,301	50	E	--	--	--	--	--	--	1	0.01	--	--
15	US 101	from Tennant Avenue to San Martin Avenue	SB	AM	67	3	6,900	2,802	14	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	36	3	6,900	6,161	57	E	--	--	--	--	--	--	1	0.01	--	--
16	US 101	from San Martin Avenue to Masten Avenue	SB	AM	67	3	6,900	2,602	13	B	--	--	--	--	--	--	2	0.03	--	--
			SB	PM	47	3	6,900	6,491	46	D	--	--	--	--	--	--	1	0.01	--	--

[1] Source: Santa Clara Valley Transportation Authority Congestion Management Program Monitoring Study, 2016.
Bold indicates unacceptable LOS.
Boxed indicates significant impact.

4.
Year 2035 General Plan Conditions

This chapter describes Year 2035 General Plan traffic conditions with and without the proposed project. General Plan conditions are comprised of forecasted traffic volumes and reflect estimated traffic growth in the City of Morgan Hill for the Year 2035. This chapter describes the procedure used to determine Year 2035 General Plan traffic volumes and the resulting traffic conditions.

Significant Impact Criteria

Significance criteria for impacts on intersections are based on the City of Morgan Hill Level of Service standards and impact criteria, and is described in the previous chapter.

Year 2035 General Plan Land Use and Traffic Forecasts

Year 2035 General Plan traffic volumes were developed based on traffic forecasts produced for the City of Morgan Hill 2035 General Plan using the City's Traffic Demand Forecasting (TDF) model. The Year 2035 General Plan traffic forecasts include land use growth and transportation improvements associated with buildout of the City's General Plan. The projected traffic growth was calculated by taking the difference between Base Year 2015 and Year 2035 forecasted turn movement volumes. This projected growth was added to the existing traffic volumes to derived Year 2035 General Plan traffic conditions.

Project trips, as presented in the previous chapter, and the reassignment of future traffic volumes (anticipated change in travel patterns in the immediate project area) resulting with the proposed Depot Street realignment, were added to the Year 2035 General Plan conditions traffic volumes to obtain Year 2035 General Plan plus project conditions traffic volumes.

Figures 10 and 11 show the Year 2035 General Plan and Year 2035 General Plan plus project traffic volumes, respectively. Appendix B lists each of the components used to tabulate General Plan traffic volumes at each study intersection.

Year 2035 General Plan Transportation Network

Several new roadways are planned under 2035 General Plan conditions to provide for enhanced connectivity and circulation throughout the City. However, no roadway network improvements are planned for the Downtown area. Therefore, it is assumed in this analysis that the roadway network and intersection lane configurations under General Plan conditions would be the same as described under

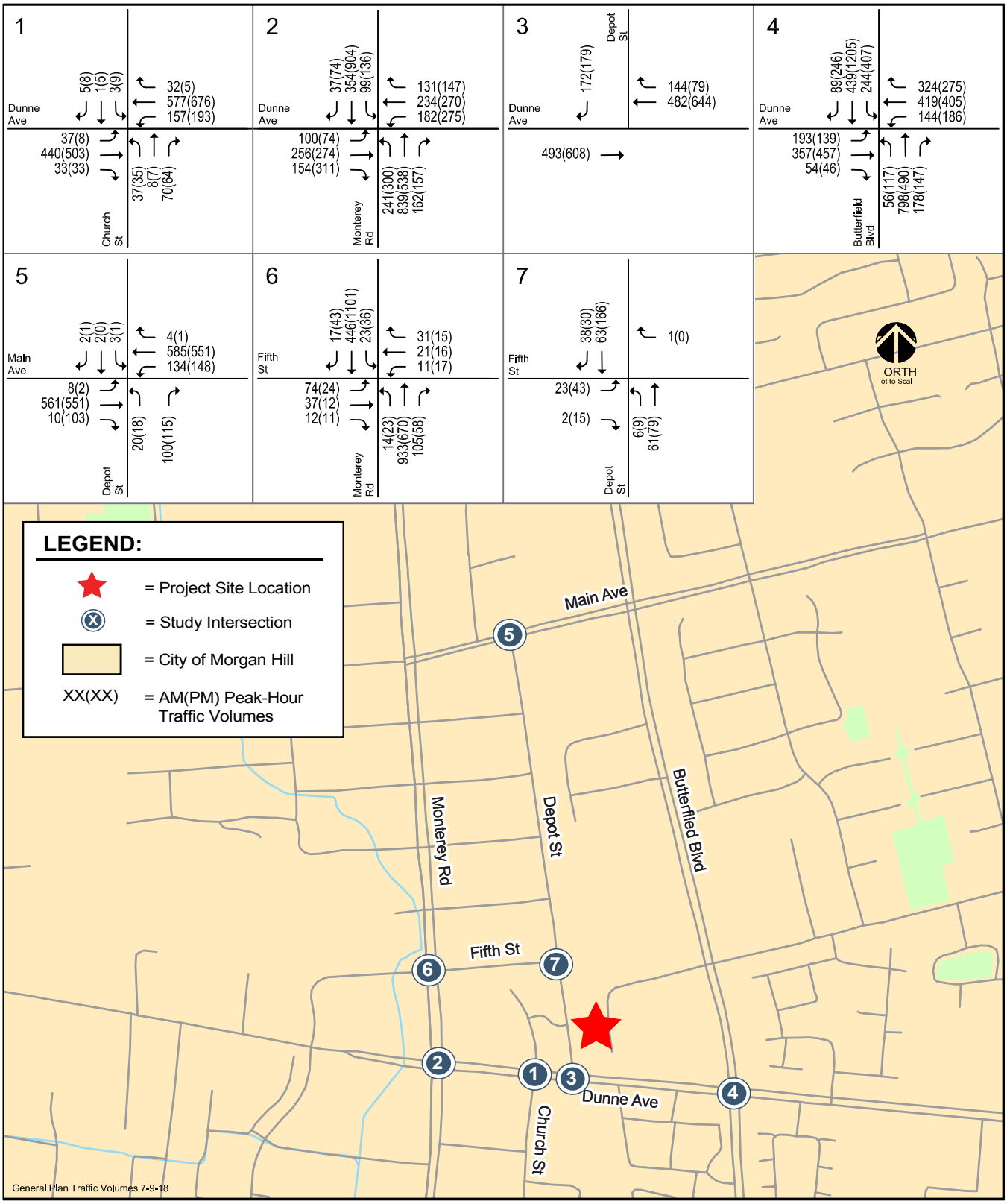


Figure 10
Year 2035 General Plan Traffic Volumes

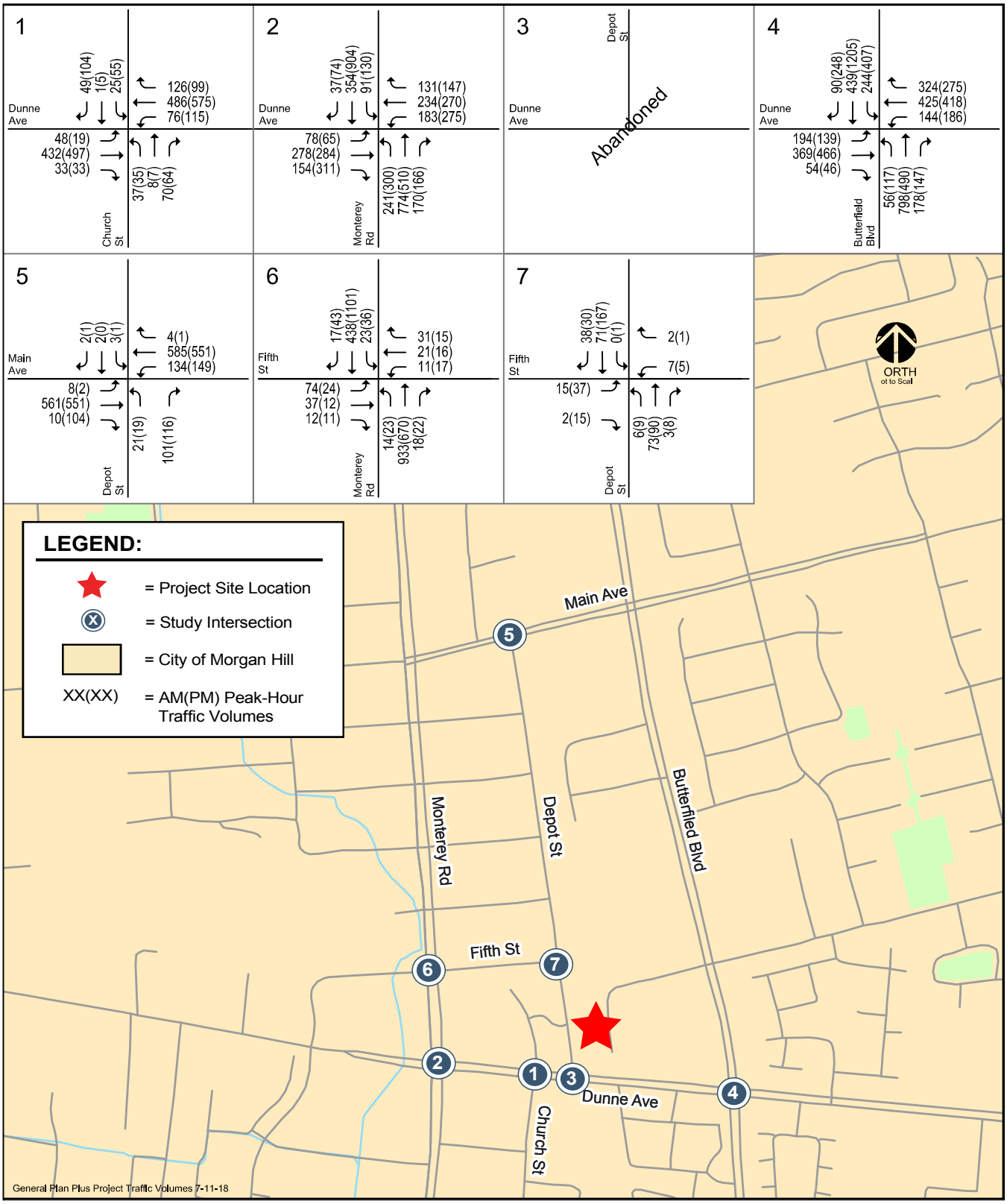


Figure 11
Year 2035 General Plus Project Traffic Volumes

existing conditions. The transportation roadway network under Year 2035 General Plan plus project conditions would be the same as described under existing plus project conditions, including the proposed Depot Street realignment and the Depot Street/Dunne Avenue intersection abandonment (described in the previous chapter).

Intersection Levels of Service under General Plan Conditions

The level of service results under Year 2035 General Plan without and with project conditions are summarized in Table 9. The results show that, measured against the City of Morgan Hill level of service standards, all the study intersections are projected to operate at acceptable levels of service under Year 2035 General Plan and General Plan plus project conditions during each of the peak hours analyzed. Therefore, no study intersections would be significantly impacted by the project, according to the City's level of service impact criteria.

The signal warrant analysis indicates that the intersection of Depot Street and Main Avenue is projected to have traffic conditions that would meet the traffic signal warrant during the PM peak-hour under both Year 2035 General Plan and General Plan plus project conditions. However, the intersection also is projected to continue to operate at acceptable levels of service during both peak hours. Therefore, according to the City of Morgan Hill level of service impact criteria for unsignalized intersections, this is not considered a significant project impact.

The level of service calculation sheets are included in Appendix C. The peak-hour signal warrant sheets are contained in Appendix D.

Table 9
Year 2035 General Plan Intersection Levels of Service

Int. #	Intersection	Intersection Control	LOS Standard	Peak Hour	Year 2035 General Plan Delay[1]	Year 2035 General Plan LOS	Year 2035 GP Plus Project Delay[1]	Year 2035 GP Plus Project LOS	Incr. In Crit. Delay	Incr. In Crit. V/C
1	Church Street and Dunne Avenue	Signal	E	AM	20.0	B	18.1	B	-2.4	0.016
				PM	20.7	C	24.0	C	5.9	0.099
2	Monterey Road and Dunne Avenue	Signal	E	AM	30.7	C	30.4	C	-0.8	-0.039
				PM	36.2	D	36.2	D	0.0	0.000
3	Depot Street and Dunne Avenue	One-Way Stop	E	AM	12.0	B	*Intersection Abandoned*			
				PM	12.8	B				
4	Butterfield Boulevard and Dunne Avenue	Signal	D	AM	40.4	D	40.4	D	0.1	0.002
				PM	38.9	D	39.0	D	0.2	0.004
5	Depot Street and Main Avenue	Two-Way Stop	E	AM	38.6	E	38.6	E	N/A	N/A
				PM	35.5	E	35.8	E	N/A	N/A
6	Monterey Road and Fifth Avenue	Two-Way Stop	F	AM	96.5	F	81.0	F	N/A	N/A
				PM	127.0	F	122.1	F	N/A	N/A
7	Depot Street and Fifth Avenue	Two-Way Stop	F	AM	9.5	A	9.6	A	N/A	N/A
				PM	10.2	B	10.5	B	N/A	N/A

[1]The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection. The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

5.
Other Transportation Issues

This chapter presents an analysis of other transportation issues associated with the project site, including:

- Vehicular site access
- On-site circulation
- Intersection operations analysis – vehicle queuing and left-turn pocket storage at intersections
- Potential impacts to bike, pedestrian and transit facilities

Unlike the level of service impact methodology, which is adopted by the City Council, the analyses in this chapter are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community.

Site Access and Circulation

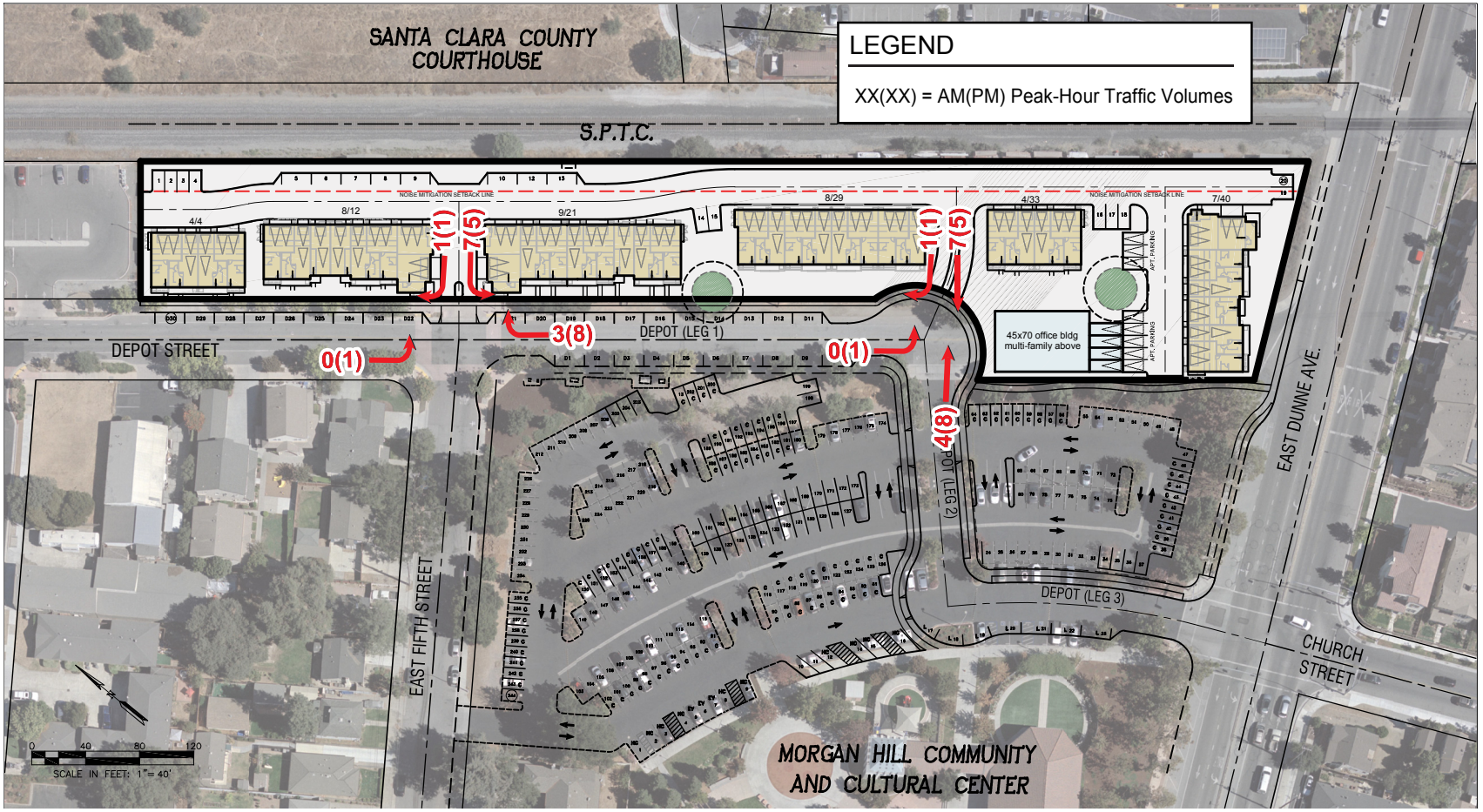
A review of the project site plan was performed to determine if adequate site access is provided and to identify any access and circulation issues that should be improved. This review is based on the project site plan prepared by RJA dated May 21, 2018 and in accordance with generally accepted traffic engineering standards.

Site Access

Access to the project site would be provided via two driveways along Depot Street. The first driveway would be located at the intersection of Depot Street and Fifth Street, while the second driveway would be located at the first bend of the proposed Depot Street realignment. Both driveways would provide full access to and from the project site.

The proposed new intersection of Depot Street with Church Street and Dunne Avenue would provide full access to the project site to all project traffic on Dunne Avenue, including traffic originating from and heading to US 101 and locations south of Dunne Avenue. Project traffic to and from the north would access the project site via the existing full-access Depot Street and Main Avenue intersection. The estimated project trips at each of the site driveways are shown on Figure 12.

The level of service analysis presented in previous chapters shows that both the study intersections of Depot Street with Main Avenue and Church Street/Dunne Avenue are projected to operate acceptably with implementation of the proposed project under both existing plus project and Year 2035 General Plan plus project conditions.



Source: RJA - Ruggeri-Jensen-Azar, May 21, 2018

Figure 12
Project Trips Site Access Driveways

On-Site Circulation

A single drive aisle, located east of the proposed buildings and parallel to Depot Street, would provide access to the proposed housing units and office space via the two proposed driveways. Although the drive aisle's dimensions are not shown on the site plan, the drive aisle is shown to consist of two travel lanes with short segments that include on-street 90-degree or parallel parking spaces. A total of 19 parking spaces along the internal drive aisle are shown of the site plan. According to the site plan, these parking spaces would be designated as guest parking (the site plan lists 20 guest parking spaces although only 19 are shown on the site plan).

The site plan shows all town home units to have a two-car garage that would be accessible via the internal drive aisle, with the exception of two units located along the access driveway on Fifth Street and six units located along a short east-west drive aisle at the south end of the project site. The short drive aisle also would provide direct access to the condominium units designated parking.

The entrance to the parking garages located along the Fifth Street project driveway are shown to be approximately 30 to 40 feet from the driveway/Depot Street. This distance would provide adequate storage space for one vehicle to queue up at this driveway without blocking Depot Street in the given case access to the project site was momentarily blocked by vehicle ingress/egress activity at these garages. However, it is not anticipated that the locations of these two garage entrances, in relation to the access driveway, would create access or on-site circulation issues since it is estimated that a maximum of 9 vehicles would enter the project site via this driveway during the peak-hour. The estimated project traffic volumes are relatively low that the development of vehicle queues at the project site driveways is very unlikely.

The site plan shows three dead end aisles within the project site – one each at the north and south ends of the site and a third one at the end of the short east-west drive aisle. Dead end aisles are less desirable because drivers will enter the aisle, and upon discovering that there is no available parking, must back out or conduct three-point turns. In areas where parking spaces are designated for specific individuals or where traffic volumes are relatively low, like in the case of the proposed project, dead end aisles are less problematic. Therefore, it is not anticipated that the proposed dead-end aisles would have an effect on the on-site circulation.

The straight nature of the internal drive aisle, along with the two proposed access points, would facilitate vehicular circulation within the site. However, it could also result in drivers traveling at higher than the recommended speeds. For this reason, it may be desirable to implement speed-reducing measures along the internal drive aisle. These measures could be as simple as posting speed limit signs and/or using removable on street signs, to more permanent measures such as the installation of speed bumps/humps along the internal drive aisle.

In order to provide adequate on-site circulation for all vehicle types, including larger emergency vehicles and garbage and delivery trucks, the design of all drive aisles and access driveways should adhere to City of Morgan Hill design standards and guidelines. The design of the site must include adequate corner radii, driveway width, drive aisle width, parking dimensions, and signage to the satisfaction of the City of Morgan Hill design standards. Adhering to City of Morgan Hill standards and requirements, the proposed site access driveways and internal drive aisle layout would be adequate to accommodate circulation of both passenger and emergency vehicles.

The project site plan shows pedestrian connections between all proposed buildings on site and the proposed sidewalks along the project site frontages on Depot Street. Providing clear pedestrian connections between the proposed project and proposed and existing pedestrian facilities along the adjacent streets would facilitate pedestrian travel between the project site and other pedestrian destinations, such as the Downtown area, the Community and Cultural Center, and the Caltrain Station.

Additionally, the continuous sidewalks along Depot Street and a proposed new pedestrian connection that would run from Depot Street to Dunne Avenue adjacent to the project site, along with the traffic signal at the intersection of Depot Street/Church Street and Dunne Avenue would provide a pedestrian connection between the project site and the existing land uses on the south side of Dunne Avenue. Therefore, based on the existing and proposed pedestrian facilities in the project area, pedestrian circulation would be adequate.

Recommended Site Access and On-Site Circulation Improvements

Installation of Speed-Reducing Measures. Due to the straight nature of the internal drive aisle, it may be desirable to implement speed-reducing measures to limit/prevent drivers from traveling at speeds that are unsafe. These measures could be as simple as posting speed limit signs and/or using removable on street signs, to more permanent measures such as the installation of speed bumps/humps along the internal drive aisle.

Adhere to City of Morgan Hill Design Standards and Guidelines. The design of the project site, including but not limited to driveways, sidewalks, corner radii, drive aisle width, parking dimensions, and signage, should adhere to City of Morgan Hill design standards and guidelines.

Intersection Operations Analysis

The analysis of intersection level of service was supplemented with an analysis of intersection operations for selected intersections where the project would add a significant number of left-turning vehicles. The operations analysis is based on vehicle queuing for high demand left-turn movements at intersections. Vehicle queues were estimated using a Poisson probability distribution, which estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$P(x=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:
P (x=n) = probability of "n" vehicles in queue per lane
n = number of vehicles in the queue per lane
λ = Average number of vehicles in the queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future left-turn storage requirements at intersections. The 95th percentile queue length value indicates that during the peak-hour, a queue of this length or less would occur on 95 percent of the signal cycles. Likewise, a queue length larger than the 95th percentile queue would only occur on 5 percent of the signal cycles (about 3 cycles during the peak hour for a signal with a 60-second cycle length). Therefore, left-turn storage pocket designs based on the 95th percentile queue length would ensure that storage space would be exceeded only 5 percent of the time. The 95th percentile queue length is also known as the "design queue length".

The intersection of Depot Street/Church Street and Dunne Avenue is the only intersection where the project is anticipated to add more than 10 peak-hour trips per lane to some of the intersection movements. Thus, the eastbound left-turn and westbound left-turn movements and the southbound approach at the intersection were evaluated.

The vehicle queue estimates and a tabulated summary of the findings are provided in Table 10. The vehicular queuing analysis (Poisson probability calculations) is included in Appendix E.

The results of the queuing analysis at the intersection of Depot Street/Church Street and Dunne Avenue indicate that all intersection movements evaluated are projected to have adequate queue storage capacity to accommodate the estimated maximum queue lengths that would result with implementation of the project.

The projected maximum queue length of 2 vehicles, or 50 feet, for the eastbound left-turn movement could be accommodated within the existing queue storage capacity of approximately 125 feet.

The westbound left-turn queue length is projected to decrease by one vehicle from existing conditions, as existing southbound Depot Street to eastbound Dunne Avenue traffic would no longer access this turn pocket to make a U-turn with implementation of the proposed Depot Street realignment.

At the southbound approach of the intersection, however, the addition of project traffic, in addition to the Depot Street realignment, would result in the increase of the maximum queue length by 6 vehicles (from 2 to 8 vehicles, or 50 to 200 feet) during the PM peak-hour. This projected maximum queue length could be accommodated along the entire length of the street, however, the queue must not block access to any of the three Community and Cultural Center parking lot driveways proposed be located along the realigned Depot Street. The first driveway to the center's parking lot along the realigned Depot Street would be located approximately 175 feet from Dunne Avenue, and the next two driveways (one on each side of the street) would be located approximately 280 feet north and east of Dunne Avenue. A southbound queue length of 200 feet would extend past the first Community and Cultural Center parking lot driveway. Thus, it may be desirable to install "Keep Clear" pavement markings adjacent to one (the western driveway) or both of the center's driveways along the realigned Depot Street.

Project generated traffic at other locations would be too low to have a measurable effect on queue lengths.

Recommended Operations Improvements

Installation of "Keep Clear" Signs. It is recommended that "Keep Clear" pavement markings be installed adjacent to one (the western driveway) or both of the Morgan Hill Community and Cultural Center parking lot driveways located along the realigned Depot Street. This will prevent projected maximum vehicle queue lengths at the intersection of Depot Street/Church Street and Dunne Avenue (southbound approach) from blocking access to/from the center's parking lot.

Parking Demand Analysis

According to the Morgan Hill Downtown Specific Plan, dated November 2009, residential projects located within the Downtown Specific Plan area are required to provide the following number of parking spaces: 1.0 parking space for residential units smaller than 600 square feet, 1.5 parking spaces for residential units between 600 and 1,350 square feet, and 2.0 parking spaces for residential units greater than 1,350 square feet. Office space located within the Downtown Specific Plan area is required to provide one off-street parking space per 250 square feet of floor area.

Table 10
Queuing Analysis Summary

Measurement	Church Street and Dunne Avenue					
	EBL AM	EBL PM	WBL AM	WBL PM	SB AM	SB PM
Existing Conditions						
Cycle Length (sec)	60	90	60	90	60	90
Lanes	1	1	1	1	1	1
Volume (vph)	37	8	71	124	9	22
Volume (vphpl)	37	8	71	124	9	22
95th %. Queue (veh/ln.)	2	1	3	6	1	2
95th %. Queue (ft./ln)[1]	50	25	75	150	25	50
Storage (ft./ ln.)	125	125	150	150	Unlimited	Unlimited
Adequate (Y/N)	YES	YES	YES	YES	YES	YES
Existing Plus Project Conditions						
Cycle Length (sec)	60	90	60	90	60	90
Lanes	1	1	1	1	1	1
Volume (vph)	48	19	62	88	75	164
Volume (vphpl)	48	19	62	88	75	164
95th %. Queue (veh/ln.)	2	2	3	5	3	8
95th %. Queue (ft./ln)[1]	50	50	75	125	75	200
Storage (ft./ ln.)	125	125	150	150	Unlimited	Unlimited
Adequate (Y/N)	YES	YES	YES	YES	YES	YES

Notes:
[1] Assumes 25 feet per vehicle queued
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound, R = Right, T = Through, L = Left.

The site plan shows two parking spaces provided for each of the 40 town home units, for a total of 80 covered parking spaces. Additionally, 8 “apron” parking stalls (4 which would be covered) and 4 additional uncovered stalls are being proposed for the 2-bedroom and 1-bedroom, respectively, condominium units located. The site plan also lists 20 guest parking spaces (although only 19 parking spaces are shown on the site plan). However, no parking spaces are listed or designated on the site plan for the office space. Based on the above Downtown parking requirements, a total of 13 parking spaces should be provided to serve the proposed office space.

Recommended Parking Improvements

Provide Required Number of Parking Spaces. The proposed project must provide the minimum number of parking spaces required to satisfy the City’s Downtown Specific Plan parking requirements.

Transit, Pedestrian and Bicycle Analyses

The project site is served by three VTA bus lines, one MST bus line, and Caltrain. The transit stops on Monterey Road/Dunne Avenue and at the Morgan Hill Caltrain Station are located within walking distance from the project site. A typical mode split in Morgan Hill would be a three percent transit share. Assuming up to three percent transit mode share for the project equates to no more than 1 transit rider

during each of the peak hours. The transit ridership demands of the proposed project can be accommodated by the existing transit services serving the project site.

Sidewalks are provided along both sides of the street on Dunne Avenue, Monterey Road, Fifth Street, and Depot Street, with the exception the segment on Depot Street along the project site's frontage, south of Fifth Street. With implementation of the proposed project, sidewalks would be provided along the entire east side of Depot Street, along the project site frontage and the realigned roadway. Additionally, the site plan shows a pedestrian pathway that would run from Depot Street to Dunne Avenue, adjacent to the project site, providing a direct pedestrian connection between the project site and Dunne Avenue. The proposed pedestrian facilities would enhance existing pedestrian facilities, providing a more complete pedestrian network. Therefore, based on the existing and proposed pedestrian facilities in the project area, continuous pedestrian connections between the project site and surrounding pedestrian destinations would be available, resulting in adequate pedestrian circulation to and from the project site.

There are several bike lanes and bike paths in the vicinity of the project site, some of which serve the project site directly. Depot Street currently has bike lanes along most of its length, with the exception of the small segment between Fifth Street and Dunne Avenue. Monterey Road has bike lanes along nearly its entire length within City of Morgan Hill limits, with the exception of the segment that runs through downtown between Dunne Avenue and Main Avenue, which is designated as a bike route. Bike lanes also are provided along Dunne and Main Avenues.

The site plan shows on-street parking on both sides of the street along the project site frontage on Depot Street. This segment of Depot Street is shown on the site plan as having a 40-foot curb-to-curb right-of-way and would include two 12-foot travel lanes and 8 feet of parking on both sides of the street. The proposed Depot Street cross-section along the project site frontage does not include bike lanes. Additionally, an approximately 200-foot segment of the existing bike lane on the east side of Depot Street, north of Fifth Street and along the project site frontage, would be removed to accommodate the proposed on-street parking. Therefore, the existing bike lane on Depot Street would continue to be incomplete. However, the proposed pedestrian pathway that would connect Depot Street to Dunne Avenue, adjacent to the project site, also could be utilized by bicycle traffic, connecting the existing bike lanes on Dunne Avenue to Depot Street.

Conservatively assuming that bicycle trips would comprise no more than five percent of the total project-generated trips, this calculates to no more than 1-2 new bicycle trips during the peak hours. The demand generated by the proposed project could be accommodated by the existing bicycle facilities in the vicinity of the project site.

6. Conclusions

The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Morgan Hill and the Santa Clara Valley Transportation Authority (VTA). The study includes an analysis of AM and PM peak-hour traffic conditions for seven intersections and 16 directional freeway segments. The weekday AM peak hour of traffic is generally between 7:00 and 9:00 AM and the weekday PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on a typical weekday.

The impacts of the project on intersections were identified on the basis of the City of Morgan Hill Level of Service standards. Project impacts on other transportation facilities, such as pedestrian facilities, bicycle facilities and transit, were determined on the basis of engineering judgment.

Existing Plus Project Intersection Levels of Service Analysis

The results of the intersection level of service analysis under existing plus project conditions show that no study intersections would be impacted by the project according to City of Morgan Hill level of service standards.

Freeway Segment Analysis

The results of the freeway level of service analysis shows that the proposed project would not result in a significant impact under project conditions on any of the study freeway segments.

Year 2035 General Plan Intersection Levels of Service Analysis

The results of the intersection level of service analysis under Year 2035 General Plan plus project conditions show that no study intersections would be impacted by the project, according to City of Morgan Hill level of service standards.

Other Transportation Issues

Site Access and Circulation

Recommended Site Access and On-Site Circulation Improvements

The following are recommended adjustments to improve site access and on-site circulation:

Installation of Speed-Reducing Measures. Due to the straight nature of the internal drive aisle, it may be desirable to implement speed-reducing measures to limit/prevent drivers from traveling at speeds that are unsafe. These measures could be as simple as posting speed limit signs and/or using removable on street signs, to more permanent measures such as the installation of speed bumps/humps along the internal drive aisle.

Adhere to City of Morgan Hill Design Standards and Guidelines. The design of the project site, including but not limited to driveways, sidewalks, corner radii, drive aisle width, parking dimensions, and signage, should adhere to City of Morgan Hill design standards and guidelines. This will help provide adequate on-site circulation for all vehicle types, including larger emergency vehicles.

Intersection Operations Analysis

Recommended Operations Improvements

The following are recommended adjustments to improve operating conditions along Depot Street:

Installation of “Keep Clear” Signs. It is recommended that “Keep Clear” pavement markings be installed adjacent to one (the western driveway) or both of the Morgan Hill Community and Cultural Center parking lot driveways located along the realigned Depot Street. This will prevent projected maximum vehicle queue lengths at the intersection of Depot Street/Church Street and Dunne Avenue (southbound approach) from blocking access to/from the center’s parking lot.

Parking Demand

Recommended Parking Improvements

Provide Required Number of Parking Spaces. The proposed project must provide the minimum number of parking spaces required to satisfy the City’s Downtown Specific Plan parking requirements.

Transit, Pedestrian, and Bicycle Analysis

The transit ridership demands of the proposed project can be accommodated by the existing transit services serving the project site.

Based on the existing and proposed pedestrian facilities in the project area, continuous pedestrian connections between the project site and surrounding pedestrian destinations would be available, resulting in adequate pedestrian circulation to and from the project site.

The proposed Depot Street cross-section along the project site frontage does not include bike lanes. Additionally, an approximately 200-foot segment of the existing bike lane on the east side of Depot Street, north of Fifth Street and along the project site frontage, would be removed to accommodate the proposed on-street parking. Therefore, the existing bike lane on Depot Street would continue to be incomplete. However, the proposed pedestrian pathway that would connect Depot Street to Dunne

Avenue, adjacent to the project site, also could be utilized by bicycle traffic, connecting the existing bike lanes on Dunne Avenue to Depot Street.

The bicycle trips generated by the proposed project could be accommodated by the existing bicycle facilities in the vicinity of the project site.